JULY 1950

TRAFFIC ENGINEERING

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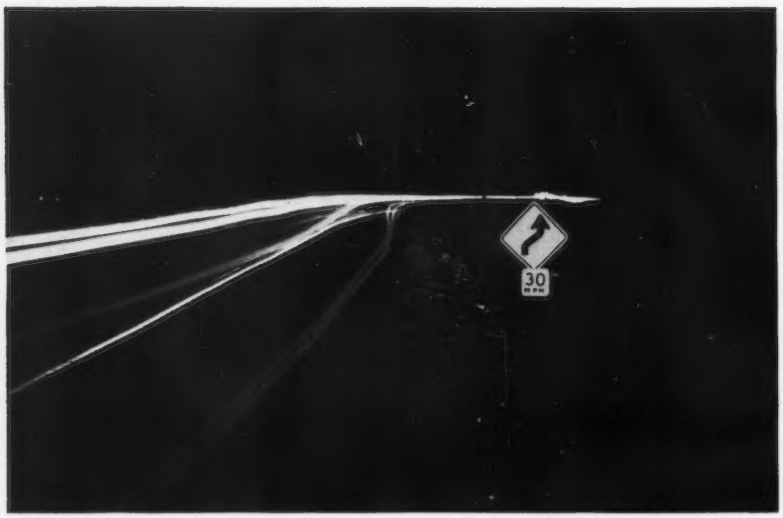
Why over 700 cities and counties get better signing at lower cost



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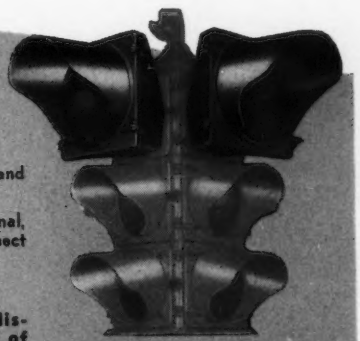

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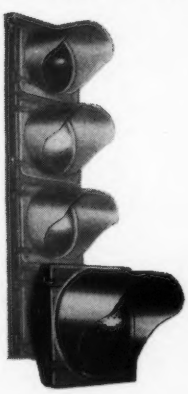

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- **Dustproof and waterproof. Neoprene gasketing throughout.**
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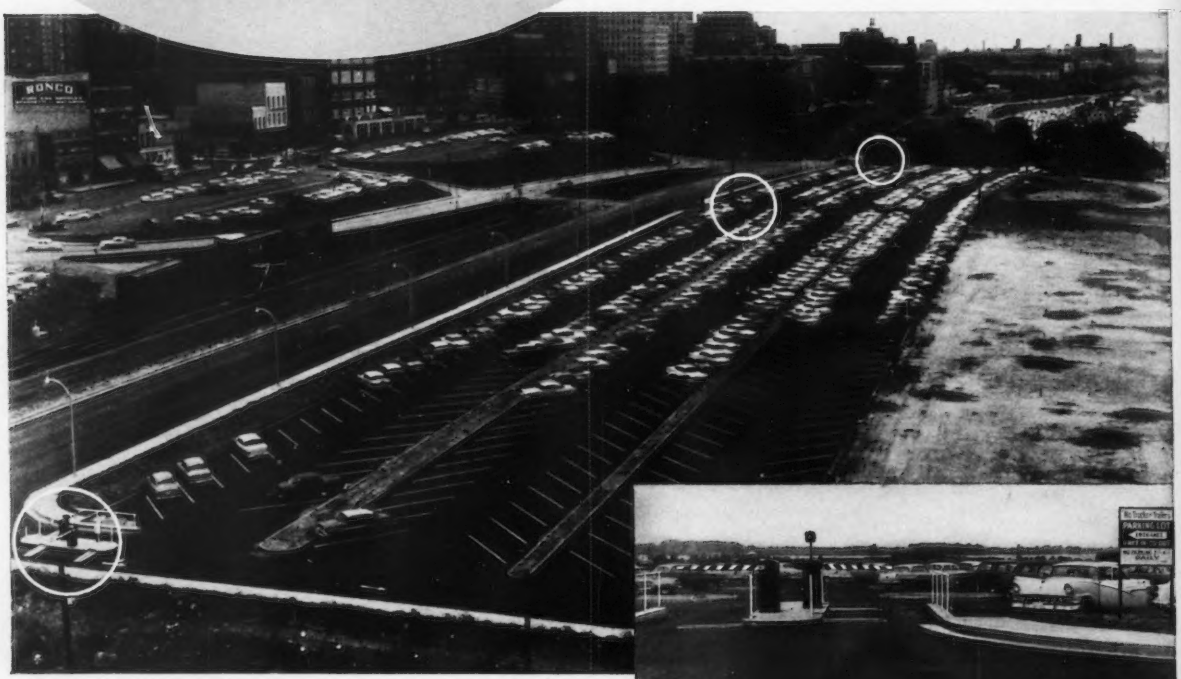

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TRAFFIC ENGINEERING

OFFICIAL PUBLICATION OF THE INSTITUTE OF TRAFFIC ENGINEERS

Vol. 29 JULY, 1959 Number 10

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COVER: The north approach to the Mackinac Bridge, showing the interchange with US-2 — looking south across the four miles of the Straits of Mackinac into the Lower Peninsula of Michigan.

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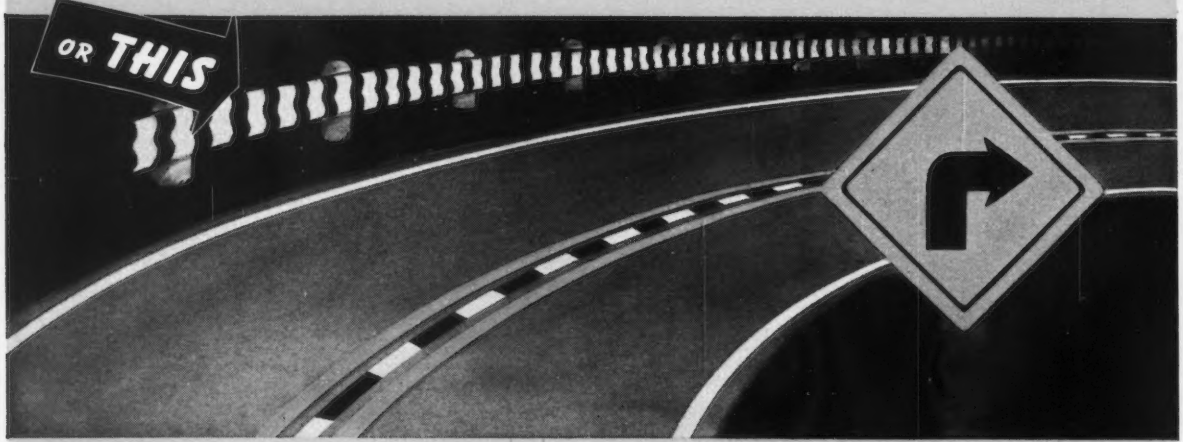

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PRELIMINARY PROGRAM

29th Annual Meeting, Institute of Traffic Engineers

Commodore Hotel, New York City

September 14 - 17, 1959

Monday, September 14

Morning . . . . Opening Session

Welcome — Response
Matson Memorial Award Paper
ITE Past Presidents' Award Paper

Noon . . . . . Luncheon

Afternoon . . . Technical Session

"Operational and Planning Aspects of Urban Trafficways"
—The State's Responsibility *(speaker to be announced)*
—The City's Responsibility, by T. T. Wiley, *Commissioner of Traffic, New York City*
—*an example*, "The Second Deck on the George Washington Bridge,"
by Edward S. Olcott, *Port of New York Authority*

Tuesday, September 15

Morning . . . . Technical Committee Meetings

(open meetings)

Afternoon . . . Annual Business Meeting

Wednesday, September 16

Morning . . . . Meetings of the Technical Departments

Uniformity of Devices
Proposed Law and Ordinance Improvements Generated by the Interstate Highway System
New Developments in Roadway Lighting
Proper Role of the Traffic Engineer and the Planner
School Crossing Protection
Speed Zones
Warrants for Pedestrian Signals
Warrants for Yield Signs
Warrants for Four-Way Stops

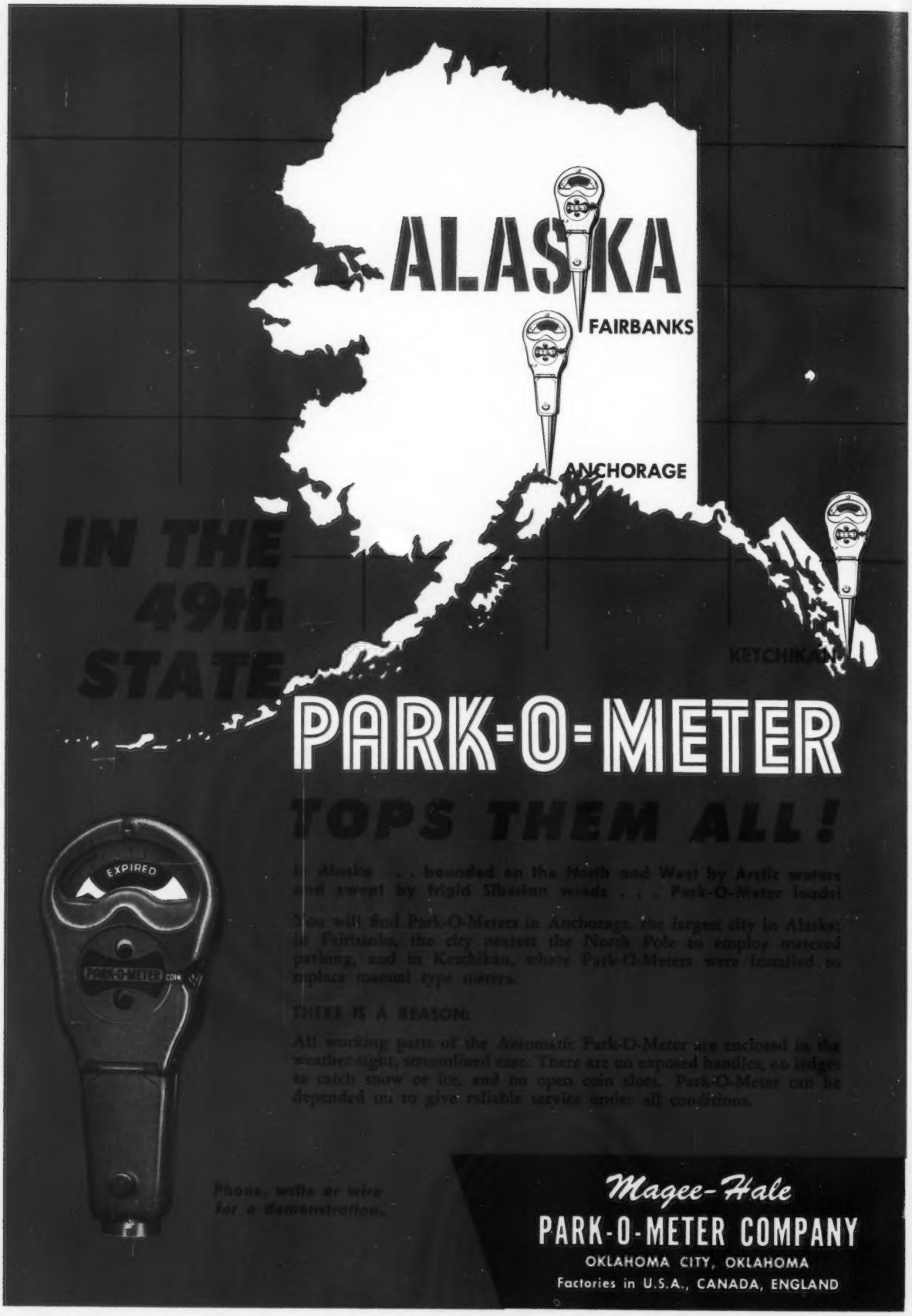
Afternoon . . . Meetings of the Technical Departments *contd.*

ITE Membership Survey
The Yale Study of Urban Transportation Administration
Civil Service Requirements and Exams for Traffic Engineering Positions
Design Criteria for Urban Expressways
Channelization Design
Driveway or Curb Cut Permits and Design
Planning Criteria for Traffic Ways
Parking Garages
Bus Terminals
Airport Parking Facilities
Pedestrian Signal Problems
Internally Illuminated Signs
Sign Supports
Arrow Signal Colors
Paint Specifications for Smaller Communities
Traffic Survey Devices

Evening . . . . Annual Banquet

Thursday, September 17

Morning . . . . Post Convention Tour—New York Harbor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Continuous Strip Photography — An Approach To Traffic Studies

by Stephen M. Sickle
Director, Market Development
Chicago Aerial Survey
Chicago, Illinois

This paper, which appeared earlier in "Photogrammetric Engineering," was presented at a meeting of the American Society of Photogrammetry as the second part of a presentation which also included the paper "Vehicle Speeds and Volumes Using Sonne Stereo Continuous Strip Photography" by Martin Wohl. Mr. Wohl's paper appeared in the January issue of "Traffic Engineering."

MEASUREMENTS of traffic factors such as speed, volume, and orientation are accomplished with sufficient accuracy and economy to warrant widespread utilization of the technique. The difficulties encountered in the application of continuous stereo strip to the usual topographic photogrammetric problems do not apply.

The type of measurements made and the photographic subject-matter of existing roadways combine to eliminate the need for controlled spatial orientation. Discussion indicates how roll, pitch and relative azimuth are taken into account.

Data extraction and reduction is greatly simplified relative to that in the usual photographic solution to traffic problems. The possibility of automatic and computer systems is also discussed.

Introduction

The practicability of photogrammetric traffic measurements involves consideration of the accuracy required and the total geometry of the situation.

The first portion of this paper indicates the accuracy requirements for traffic studies. The traffic engineer, unlike the surveyor, deals with statistical problems involving hundreds of thousands of vehicles out of many thousands. He does not have the problem of absolute accuracy for each point in a terrain model. Thus a vehicle velocity accuracy requirement of 5 or 10 per cent at lower speeds, is all that is necessary.

The various factors involved in making the continuous stereoscopic strip photographic flights and the resultant measurements can be analyzed independently. The discussion developed here treats these things practically and is not burdened with exhaustive theoretical proof. Two classes of factors affect this problem. The first is data collection or factors relating to the photographic flight, and most attention is devoted to these. The second group concerns making measurements from the film and data reduction.

Data Collection

Before proceeding with an analysis of the individual problems usually considered in photogrammetry, it is well to get a clear picture of the basic situation. By their nature traffic studies are performed on existing roads, highways and streets. With continuous stereo strip, the photographic flights are normally made at altitudes of 1000 feet and less. Given the strong visual aid of an existing roadway and the low altitude, the pilot can, to a very considerable degree, keep himself centered and use visual clues to maintain proper orientation.

A typical project involves periodic flights over one or more study sections of a highway network. Future developments in traffic engineering may lead to studies of ten mile, twenty mile and longer sections of a route, but today the flight lines are usually less than five miles long.

Scale—Scale is one of the first questions that arises in a discussion of continuous stereo strip photography. In this case, however, scale is not a factor. It is not necessary to know scale to make vehicle velocity and many geometric measurements from continuous strip photography. The following discussion is presented to indicate how scale could be handled if and where necessary.

The first and most obvious method is to accept the existence of scale variation and utilize the roadway and adjacent culture to re-construct the scale from the film. This applies to scale across the line of flight and is so easy to do that it can be done as often as is desirable.

Scale in the direction of flight is often a difficult question with continuous strip photography. However, the traffic engineer usually concerns himself with a series of roadway sections of one mile or less. Within the narrow range, and considering the advanced state of the synchronization equipment, there is no problem in using the cross film scale or average of several cross film scales.

The mathematical analysis presented in the first part of this paper presupposes accurate film speed synchronization. Although this probably would be satisfactory, it is an unnecessary assumption. The X parallax of a fixed object in the two halves of the film (see figure I) is the image of the air base.

This figure (R) measured in inches multiplied by the scale factor (X) in feet per inch gives the apparent air base. The same approach can be used throughout to make all vehicle speed measurements without reference to the actual air base, film synchronization, or scale. Proceeding with this analysis, formula I is really

$$D = RX \quad \ldots\ldots\ldots\ldots\ldots\ldots (1a),$$

and formula 3 for vehicle speed becomes

$$S_B = Sp \left(\frac{R_B}{R + R_B}\right) \quad \ldots\ldots (3a).$$

At this point scale and its related variable, altitude, drop out of the

speed and volume determinations. Thus, the existence of scale variation and difficulties in measuring scale along the line of flight do not affect traffic velocity measurements made from continuous stereo strip photography.

Relative Azimuth—The first section of this paper mentions measuring the speed of vehicles whose motion is at an angle or perpendicular to the direction of film travel. Actually there have been no instances of this, and due to the simplicity of lining up for flights their chance of occurring is slight. (Some studies will require the measurement of cross traffic.) Whether it arises by design or by accident, however, the problem is easily solved. For angles less than five degrees the correction is insignificant. Beyond this point two courses are available: measure distance in the direction of vehicle travel directly or measure along the X axis (direction of film travel) and multiply by the secant of the angle between the two directions of travel.

Roll Tilt—Variation about the roll axis is an important consideration for most photogrammetric work. This is not the case however, when using continuous stereo strip photography for traffic work. In the first place the strip camera is gyro-stabilized about the roll axis. Thus the amount of roll possible in the interval between recording a vehicle in the two lenses, or even during a whole flight line, is limited by the very slow drift rate of the gyro.

For individual vehicle measurements the time interval involved does not exceed 2.25 seconds for vehicles traveling in the same direction as the aircraft and less for vehicles opposing the direction of flight. With larger scale, smaller parallax angles, or different vehicle speeds the time is less. An average figure would approximate 0.7 to 1.1 seconds.

Since there is no true vertical reference in the aircraft it is possible to have some "permanent" roll during a flight. In practice it is felt this will never exceed five degrees. Within that limit no distortion of the traffic information is caused.

It should be noted that even if tilt about the roll axis were a factor, the accuracy of speed measurements of vehicles traveling parallel to the line of flight, or film motion, would be unaffected. The image of the air base, R, might be proportionally different for each lane of pavement, but so would the image of vehicle motion. Thus measurements made along these lines parallel to the axis of tilt could be made with the same accuracy as in the non-roll situation. As mentioned before, scale across the line of flight, perpendicular to the axis of roll tilt, does not enter into the calculations of vehicle speeds and volumes.

Pitch Tilt—Like roll, tilt about the pitch axis can be discounted as a source of error. Pitch, although of much greater magnitude than roll, has a different effect upon continuous stereo strip photography. Due to the automatic scanning and film speed control system, motion about the pitch axis causes the film to speed up or slow down depending upon the direction of rotation. On the film this is recorded as lengthening or shortening of the image of the air base. The image of vehicle motion is changed accordingly so that the resultant measurements compensate for the distortion.

It is possible for the aircraft to maintain a relatively constant nose up or nose down altitude. Although this condition produces a scale difference in the two halves of the film, it is interesting to note that none of the studies or measurements contemplated so far require working with scale on both halves of the film. Thus a constant nose-up or nose down altitude poses no more difficulty than level flight.

The preceding discussion of scale, relative direction of aircraft and vehicle travel, roll and pitch has shown that these factors do not handicap the computation of vehicle speeds and volumes from continuous stereo strip photography. The foregoing is written in reference to the nature of the problem and not as a theoretical photogrammetric proof. Full weight is given the types of measurements to be made, the range of speeds anticipated, and most importantly the particular characteristics of continuous strip photography.

Ground Speed—Aircraft ground speed does not fall into the same category as the other factors discussed. The accuracy of vehicle speed, volume and time spacing measurements depends upon the accuracy of the ground speed determination. At the low operational altitudes required for continuous strip traffic study projects navigational solutions for ground speed are too unreliable.

However, the answer lies in this low altitude and the large number of distinct landmarks which exist along a roadway. With a viewfinder and stopwatch the photographer gathers the necessary information for computing average ground speed for every flight line for every two to four miles. These short distances represent times of less than two minutes and instantaneous speed varies only a small per cent from the average.

Recording errors are possible, and these must be considered. In a recent test of twenty-four runs, twelve in each direction, over a single three-mile course, the data indicates excellent reliability, probably better than two per cent.

Data Reduction

Continuous stereo strip photography has one very important advantage so far as data reduction is concerned. This was mentioned in the first part of this paper, but it bears emphasis. The continuous strip photograph captures all vehicles, and the time separated images are irrevocably tied together in proper orientation on one piece of film.

No new data reduction equipment has been designed for the strip photography traffic problem so present techniques lack the efficiency and accuracy which will ultimately be obtainable. Even with the present system setup time is less than three hours per roll, 60 to 100 test miles, and vehicle speed measurements can be taken at the rate of 20 to 30 per hour. With minor modifications 45 to 60 measurements per hour will be the expected rate on the next project.

In traffic work, recording and computation are separate from making the measurements. The data can be handled by hand or put directly on cards or tape for automatic computation. The amount of data recorded varies greatly with test design, and recording and calculating procedures are altered accordingly.

With present techniques the operator measures to the nearest thousandth of an inch. Reproducibility of measurements is on the order of 96 to 98 per cent. This is well within the accuracy requirements that have been established.

Substantial improvements in both efficiency and reliability can be obtained easily with present technology. Essentially an elongated coordinatograph with optical fixtures is all that is needed. Suitably engineered the readout rate would exceed 90 vehicles per hour with better than 99 per cent reliability.

(Continued on page 59)

New Voice System Alerts Drivers

by C. E. Quinn
Research Laboratories
General Motors Corporation
Warren, Michigan

THE DRIVER using today's modern highways must rely almost entirely on road signs for information regarding safety and directions—the exception being in locales where standard radio broadcasts are made in his behalf at irregular intervals. Signs are effective in daylight hours. However, efficiency wanes in hours of darkness and inclement weather; and when the driver's view of the sign is obstructed by another vehicle its effectiveness has reached its absolute lower limit. In situations such as these and in cases of emergency an audible "Alert" signal or a voice message coming into the vehicle—supplementing rather than replacing the road sign—would reduce if not altogether eliminate the hazard associated with missing a sign. Too, it would add an extra margin of safety to travelers of expressways and toll roads where speed limits are on the increase; drivers could concentrate their attention on the road ahead rather than sharing it with hurried, part time glances aside for road signs.

A new communications system has been recently developed by the General Motors Research Laboratories for use as a driving safety aid. This system affords a means of bringing into a vehicle voice messages pertaining to emergency road conditions ahead. It utilizes the hitherto neglected induction field as a means of signal propagation and avoids the possibility of interfering with other radio services by operating at frequencies in the vicinity of 10,000 cycles per second.

Granting that voice messages brought into a vehicle is a good objective in the pursuit of highway safety, certain demands would have to be made on the system employed to do so. Some of the requirements pertinent to the design of an acceptable, effective communications system for this service are:

Controllable signal pattern.

No interference to other services from harmonics or skip.

Must cover the width of four traffic lanes from one side of the road.

Must be capable of conveying messages of high intelligibility: 500 to 1500 CPS.

Radiation must not be attenuated by the presence of other vehicles or road reinforcement.

Must be capable of covering 300 to 500 feet along the road to handle messages of three to four seconds at speeds up to 70 MPH.

Old messages must be easy to replace in repeater.

Equipment should be simple and reliable.

The receiver should be muted when no message is being received.

The transmitter should be portable and easily installed for temporary service; preferably battery operated.

Receiver should have low standby battery drain for continuous use while driving.

The ultimate system for highway safety should function so that cars passing from the opposite direction will not receive the message, i.e., it should be unidirectional.

The design of the Highway Information System developed at the General Motors Research Laboratories was aimed at meeting these requirements. Through the use of an electromagnetic induction field to carry the intelligence from a fixed roadside transmitter to the receiver in the vehicle, which is on at all times, the signal pattern coverage can be almost as closely controlled as if it were painted on the highway. No "Skip" or reflections such as encountered by normal radio transmission is possible. Nor is the signal

Figure 1
Typical installation of portable induction system for emergency roadside to vehicle communication.

strength of the induction field perceptibly affected by the presence or passing of any metallic objects, as trucks, cars, etc.

The use of a carrier frequency (9,000 cycles per second) in the middle of the audio spectrum supports induction field transmission with small, elementary antenna configurations; contrarily, standard radio-type transmission at this frequency would require antenna elements miles in length. Another advantage for operating at such low frequencies is that this region is virtually bereft of activity, making interference almost impossible, whereas other regions are overtaxed with

Figure 2
Low frequency tuner assembly and ferrite antenna. This receiving unit couples to the audio stage of the car radio.

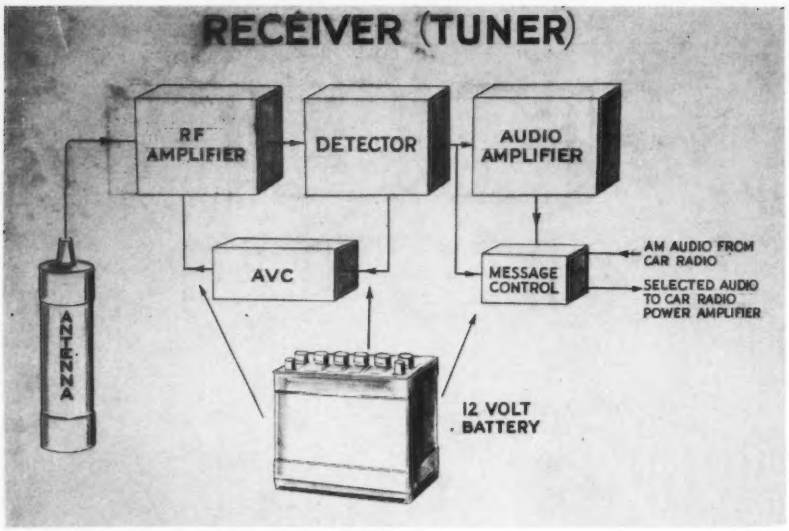

Figure 3
Block diagram of the fixed-tuned fixed-frequency tuner assembly. The message control is one of the important features of the receiving equipment.

services of every nature. Two types of antennas have been used successfully: the ferrite rod antenna seen in Figure 1, which meets the requirements for a portable-type installation and the single wire loop antenna. The latter has been found to be most attractive for permanent installations such as near expressway exits, where they can be buried several feet in the ground alongside the highway without suffering a noticeable change in signal strength. Field tests have shown this even alongside a steel-reinforced highway. A typical loop measures 300 feet long with 5-foot spacing and can be either center or end fed.

The ferrite road radiators are placed six to eight feet from the road edge and seventy feet apart in normal operation. Four such radiators cover a message area of about 300 feet along four lanes of a highway. Ferrite also serves as the core material for the receiving antenna seen in Figure 2. It provides a small, highly efficient element for vehicle installation.

Reliability, high efficiency and portability are achieved through the use of transistors. The development in recent years of transistors capable of handling several tens of watts at audio frequencies and low voltages makes it possible to use them throughout the entire transmitter. Early receivers, as shown in Figure 2, are the hybrid variety, using transistors and low voltage vacuum tubes.

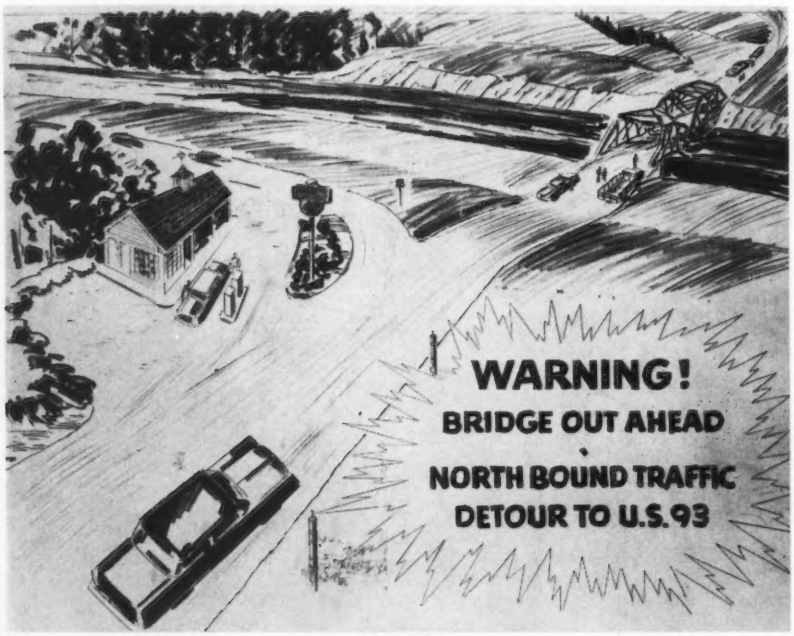

Figure 4
Drivers can be warned of unseen road blockades, slides, etc. The portable system can be set up by a highway patrolman several miles ahead of the trouble area directing the motorist to a suitable bypass.

Transmitter

The transmitter functions as a double sideband, amplitude-modulated transmitter operating at a center frequency of 9 Kcps. The modulating frequency band width is confined to the range from 400 cps to 1200 cps, which provides for a highly intelligible message while conserving on spectrum band width and transmitted power. There are several practical ways of modulating the transmitter. A microphone can be used for "on the spot" traffic control by an enforcement officer, for example. The tape play back provides a convenient way for a message to be repeated at several second intervals. Master control of messages could be effected from the highway authority offices through telephone lines. A coded tone generator is envisioned for special service use; for example, to operate a maximum speed limit indicator in the vehicle.

Power for the transmitters can be derived from storage batteries or, if available, from standard 60 cps utility power lines. For added protection a battery can be floated across the power line operated source to provide service in the event of power line failure.

Receiver

Figure 3 shows a block diagram of the system tuner-type receiver which works in conjunction with the transistorized power output stage of the car radio. Since transmitters everywhere would operate on the same carrier frequency if it is to be a nationwide service, the receiver tuning is fixed to this frequency, thereby simplifying its design. Automatic volume-control is required to maintain constant sound level in the vehicle as it passes through the varying field strength of the antenna pattern associated with the ferrite rod radiators. The message control circuit is the only departure from standard radio design practice; it is the "brains" of the receiver. When a message arrives at the receiver the message control circuit (a) mutes the car radio program if the radio is playing and allows the safety message to come through the same

(Continued on page 43)

Metropolitan Area Traffic Problems

An Address by
Hon. T. T. Wiley
Commissioner of Traffic
City of New York

TRAFFIC AND the weather have one thing in common — everybody talks about them because everybody is involved in them. But I'm not going to talk about the weather, because neither I nor apparently anyone else can do much about it. Let's do talk about traffic, because that is something that much can be done about.

We are often asked the question "What is the solution for the traffic problem?" To which we ask the return question "What traffic problem?" This reply comes as a shock to some people who wonder if we are so stupid as to believe that there is no traffic problem. But the point is, the traffic problem is really a multitude of problems. There is no one solution and, for that matter, there is no combination of solutions which will erase all traffic difficulties.

But, if the original question had been phrased properly "What can be done about traffic?", then the answer is that many things can be done about it, they have been done, they are being done, and they will continue to be done.

In a metropolitan area such as New York and its environs, the problems of transportation probably become about as complex as one can imagine. We have various types of transport: railroads, subways, buses, trucks, and the passenger car. And, oh yes, let's not forget feet. The pedestrian is a very important part of the traffic situation in any metropolitan area.

Because the problems of transportation in metropolitan areas are so complex and because they are so vital to the prosperity and welfare of the area, we continually hear grave cries of alarm about the traffic situation. Something radical must be done or the city will strangle to death in its own traffic. Now, we would be the last ones to say that we should merely maintain the status quo and do nothing. The achievements of the Department of Traffic in its realm of responsibility, and of other agencies in the highway field in particular, speak for themselves. But we have the lunatic fringe which comes up with such idiotic proposals as to keep all passenger cars out of midtown and lower Manhattan; or allow only essential traffic in the bridges and tunnels during the rush hours. Of course, these people who have no responsibility in the field of highway transport are usually so situated that they have no appreciation of the problems of the people who need to move about in the city. Their thinking runs in the direction of fancy new plans for new types of mass transit, such as monorail, etc., and with complete disregard of the realities of the mass transportation business.

This approach to planning for the people overlooks one thing—the people.

No planner or engineer will succeed very long telling people what type of transportation is right for them. That is something that in the long run the people will decide for themselves. As a matter of fact, at one time or another, each type is right for each individual. John Smith will find that on Tuesday the automobile is essential to his transportation, while on Wednesday the wife has to have the car and he uses the railroad. And so it goes.

The real problem then, in the metropolitan area, is to provide the best possible services in all types of transportation. There is a proper place for the commuter railroad, the commuter bus, the local bus, the subway, the taxi, and the passenger car. And the function of each and every one of these forms of transportation is to serve the people.

When we address ourselves to our own particular problem, that of automotive transportation, we take on no small assignment. We all know how the use of the automobile and the truck has expanded by leaps and bounds. There is no sign that such steady increases will not continue, what with more people living in the area and car ownership ratio growing steadily.

The problem for highway engineers breaks down into two fundamental segments. One is the provision of more highways and the improvement of existing ones. The other is the squeezing of greater utility from the streets and highways which are now available. It is in the latter category that the traffic engineer plays a leading role. Traffic engineers have been looked upon for years as those fellows who deal with signs, signals, and markings. Sure enough, that's what we do, but that is only the beginning. If the problems of operation on the highway involved only signs, signals and markings, our task would really be easy.

Perhaps more light would be thrown on the subject if I give you the definition of traffic engineering as set forth by the Institute of Traffic Engineers, which is as follows: "Traffic Engineering is that phase of engineering that deals with the planning and geometric design of streets and highways and abutting lands, and with traffic operation thereon as their use is related to the safe, convenient, and economic transportation of persons and goods." Note that we are dealing with problems of planning, design, and operation. And note particularly the objective—the safe, convenient, and economic transportation of persons and goods.

Now, many of you may be thinking, well, that is the objective of your work too. And I will agree. The bridge engineer, the maintenance engineer, the construction engineer, the design engineer, and the traffic engineer, not to

mention the sundry other engineers who make up that large branch of civil engineering which can be denoted generally as highway engineering — all have this one basic objective: The safe, convenient, and economic transportation of persons and goods.

That being the case, if we are to call ourselves highway engineers, we must recognize to the fullest that each of these specialties in the highway field has an important role to play and that the well rounded highway engineer must have a full understanding of the relationships of his particular assignment to that of each of the others in the field.

There is one element that ties all of this together—people. Note that our objective is not the movement of vehicles, but the transportation of people and goods.

Let's take a look at the traffic problem then from the standpoint of people and relate it directly to planning. Traffic engineers started long ago collecting information about the movements of people as a guide to planning of highway programs. For example, the Illinois Division of Highways conducted a state-wide traffic survey in 1931 and 1932 which involved primarily a determination of the volume of movement on the state highway system. This would be considered very elemental today, but it was one of the early studies made and was quite valuable in establishing that state's highway program for several years. The one in Illinois and other states was the forerunner to the establishment of highway planning divisions in state highway department agencies.

In Detroit the traffic agency made a comprehensive analysis of the origin and destination of peoples in their travel to and from work and from the shopping areas in the city. This study was used in developing a comprehensive plan for expressways and has been the guide for expressway development in that city. This went farther than the early traffic volume surveys and got down closer to the real needs of the people.

Various communities have undertaken the home interview type of study to determine the traffic habits of people of the community. This gets into all types of transportation, and becomes a fundamental basis for planning for the present and future transportation needs of the community. The Chicago area transportation survey now under way, is an excellent example of this type of planning.

There have been many surveys of a specific nature, including that participated in jointly by the State Department of Public Works, The Port of New York Authority, The Tri-Borough Bridge and Tunnel Authority, and the Department of Traffic of the city of New York covering the highways leading in and out of the area, and the various river crossings. Data from this study has been highly valuable in making specific determinations of the design of the lower Manhattan expressway.

Such planning studies, by which the needs and desires of the people are determined, are essential to take the guess-work out of planning and design and put engineering in. When it costs many millions of dollars per mile to build an expressway in the metropolitan area, it is the height of rashness not to make a thorough traffic analysis. One bad guess on entrance or exit requirements or on total lane requirements can reduce the actual utility of the facility far below its desired capacity.

Let's say a brief word about design at this point. Here is a function in which I think we engineers are too inclined to become involved in the inanimate factors such as the alignment, gradients, drainage, turning radii, etc. All these things are very carefully drawn up on the plans and carefully checked in the field. But in this very process, don't we again overlook the one most important factor—people? Does anyone ever make a traffic check of the plans? By traffic check we don't mean just peering over the plans to see whether a person can get from here to there. We mean going through the real, difficult mental exercise of driving that highway in all directions as though it were actually in existence. This is no mean trick. It calls for a degree of imagination which many do not have. But if the design is to be really checked in terms of its ability to move persons and goods safely, conveniently, and economically, then such an imaginary trip as a traffic check is more important than the field check. The designer who bends down to table level and squints at his layout to get a flat perspective of the geometry of his plan has got the right idea because he is getting a look at his design somewhat as it will look to the driver. On the other hand, the designer who takes several curves out of the box to find the one that joins up a couple of tangents, is not designing for the people but for the clock.

Now, if we move on to operations, there is no mistake about dealing with people here. We hear from them vociferously and directly.

People are not hesitant about saying that "we need a signal here," or that "the signals hold us up," or "we can't find a place to park," or "we've got to take parking off," or "there are too many taxis," or "I couldn't catch a taxi." So it goes. They ask "why don't you do something about the congestion on the Queensboro Bridge," or "what are you going to do about the traffic at the interchange of the Meeker Avenue viaduct and the Long Island Expressway?" Note that all these comments have one thing in common—they are the expression of the needs and problems of individuals. What is one man's cake may be another's poison. All of which doesn't make the life of a traffic engineer any happier, but it certainly does point up the fact that the objective of this whole business of highway engineering is providing for the safe, convenient, economical transportation of people.

Having been involved in planning, design, and operation activities over the years, we have come to one unequivocal conclusion about the relative importance of those three functions. Operation must be the dominant factor.

This should be no surprise because a highway which operates smoothly and effectively is the end product of planning and design.

We engineers have learned a lot through the years about operations on our local streets, on secondary arteries, on major arteries, and on expressways. There have been many worthwhile research projects. And of course, there is no substitute for experience and learning from such experience.

If operations is the end product, then isn't operations really the starting point in design? We believe that more and more the evidence shows that the answer is yes. For example, the California Highway Department has an interesting and important policy on interchange design. Various geometric treatments of a proposed interchange are drawn up and the traffic engineer checks each of them out for directional signing. If he finds that any one design cannot be appropriately signed for the

easy guidance of motorists traversing them, then that idea is discarded. This is putting first things first—service to the public through proper operations.

And another example, the interchange of the Ford Expressway with Livernois Avenue in Detroit was laid out so that the exit ramps would intersect with Livernois Avenue approximately 1000 feet apart. This cost several hundred thousand dollars extra, but was done in order to provide a suitable spacing of traffic signals on Livernois Avenue which carried something better than 50,000 vehicles per day. If the original diamond layout had been used the signals would have been approximately 300 to 350 feet apart, which would have destroyed progressive movement on Livernois Avenue. Those of you who are not familiar with the problems of signal timing may say, "So what?" The answer is that computations show that the additional stops caused by the unfavorable signal timing would cost the motorist about $50,000 per year. Capitalize that annual cost and you will see that it was worth while spending several hundred thousand dollars on an interchange design for satisfactory traffic operation on the intersecting street. This points out, incidentally, that grade separations of cross streets with expressways may be no bargain for the crossing street if it is necessary to signalize service drives, spaced around 300 to 400 feet apart, as is so common.

As engineers, we must constantly search to improve our efforts. One way to do this is to be self critical of what we have already done. Surely, each of us can think of some thing that would be done differently today on the basis of latest knowledge. In terms of operation of major arteries and expressways in metropolitan areas, one point of criticism is our failure to recognize and provide for peak inbound and outbound movements. And what about the problems of breakdowns and emergency service? Isn't there some reason to believe that the standard dual-roadway of three lanes each is an obsolete design? As traffic engineers, we are intrigued with the possibilities of a triple-roadway cross section, so designed and with such automatic controls operated from central headquarters or with electronic gadgetry so that the center roadway can carry inbound

(Continued on page 59)

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The Effect of Speed Zone Modifications Occasioned By the Illinois Speed Law

by Warren L. Kessler
(Member, ITE)
Assistant Operations Engineer,
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A LOGICAL APPROACH to this subject seems to be an investigation and comparison of the respective speed limit laws in effect prior to July 1, 1957, when the new law became effective, and the new law itself.

Probably all Illinois motorists now are aware that numerical ceiling limits have been imposed upon drivers of passenger cars by the new law. Absolute in character, these ceiling limits are 65 mph for passenger cars; 60 mph for buses; 55 mph for trucks 8,000 pounds or less; 50 mph for trucks over 8,000 pounds; and in urban districts, 30 mph for all vehicles. They are in effect throughout the State at all times, both day and night, without signs being posted to inform motorists of the regulations.

The new ceiling limits are in addition to the basic provisions that "No person shall drive any vehicle upon any public highway at a speed which is greater than is reasonable and proper with regard to traffic conditions and the use of the highway, or endangers the safety of any person or property." This general provision is not new and has been incorporated in the Illinois law for fifty years; it was introduced in 1909.

One section of the new law which may be unfamiliar to motorists and local authorities alike concerns the amendment containing the 30 mph limit for all vehicles for urban districts. This limit supersedes the former prima facie limits of 20 mph for business districts, 25 mph for residential districts, and 35 mph for suburban districts. A definition not too difficult to understand has been given for the term "urban district." On the other hand, an urban district is difficult, if not impossible, to identify as a motorist passes through the area.

Another change in the law which may affect every motorist, relates to a matter in which motorists have little voice; namely, altering basic statutory limits when they are inadequate to meet the current traffic needs.

Formerly, only two governmental agencies had authority to alter the basic speed limits; the Department of Public Works and Buildings on State Highways under its jurisdiction, and the City of Chicago on streets and highways for which it was responsible. The present law authorizes all local authorities except township organizations to alter the basic speed limits. With the hope of preventing abuse of this new power granted to local authorities, a further restrictive provision was included. This provision requires that any alterations in the basic statutory limits shall be made following engineering and traffic investigations.

The limits may be adjusted either upward or downward by local authorities within the following ranges: a maximum of 65 mph to a minimum of 20 mph in urban districts, a maximum of 65 mph and a minimum of 35 mph outside urban districts. The Department is limited to a maximum of 70 mph on controlled or limited controlled access highways such as the Expressways and U. S. 66, and to a maximum of 65 mph on conventional highways. No other limitations are imposed upon the Department.

After engineering investigations and traffic studies have been completed and before the altered speeds may become effective, all revised limits must be posted with signs which conform to the standards contained in the State Manual of Uniform Traffic Control Devices. There is one exception to this rule; before any speed may be established by a county, the ordinance and supporting data from the engineering study shall be forwarded to the Department for approval.

There are many more details and ramifications to the revised or modified sections of the law which we do not have time to discuss. However, the foregoing revisions or modifications are germane to our subject.

Having stressed the major modifications, changes, or revisions of the speed law, or whichever noun you may choose to use, enough facts are more or less available that one *could* jump to conclusions as to the effects of the changes.

As for the Division of Highways, the immediate effect was a lot of work. A few of the tasks were mapping a work program, revising old sign standards and designing new, procuring new signs, changing signs and erecting new ones in the field, and developing and putting into effect policies that were needed to administer the provisions of the new law adequately.

Too, state-wide informal reports were that the conversion was orderly and accomplished with a minimum of confusion and motorists drove with extraordinary caution. Enforcement officials report speeds on open highways appeared to be considerably lower.

In addition, enthusiastic supporters have an excellent safety record to present as being directly attributed to the passage of the new law.

For an 18-month period prior to the date that the new law became effective, a total of 2,690 fatal accidents was reported in which 3,165 persons were killed. For an 18-month period after the effective date of the new law, which ended on December 31 of last year, a total of 2,502 accidents was reported with 2,948 persons killed. Thus, fatal accidents were reduced 188 in

Adapted from a paper originally presented at the Traffic Engineering Conference, University of Illinois, February 1959.

number, or 7 per cent and fatalities were reduced 217 in number, also 7 per cent. All are happy there were lives saved and wish that the solution to the present highway problem was as simple as passing a law. I would like to explain a little further.

During the same 18-month period of time, the total number of reported injury accidents and the number of persons injured increased 9.6 per cent and 10.8 per cent, respectively—all in the face of the decreased fatalities.

Moreover, vigorous traffic safety campaigns have been in effect throughout the State during the 18 months from the effective date of the new speed law. Several hundred miles of new highway have been constructed, including expressways, toll roads, and elevated skyways. Many traffic control facilities of all types have been installed or modernized, and hazardous locations have been relocated or otherwise improved. The State Highway Police force has been increased by 1,000 men and all enforcement activities throughout the State have been stepped-up. These are only a few of the many activities to improve traffic safety and traffic operation.

Yes, the speed law itself may have contributed to the reduction in traffic fatalities, but it was not the sole cause. Consequently, it is necessary to look further for evidence of the "effects," good or bad, of the "modifications" of the speed limit law.

Speed Control Program

The State highway system is comprised of approximately 14,895 miles of streets and highways. By law, the Department, through the Division of Highways, is responsible for establishing and maintaining proper speed limits on these streets and highways when the basic statutory limits are not adequate. Even prior to the enactment of the new law, the Division of Highways had been exceedingly active in a speed control program occasioned by the new speed limit law. It is this program that I will discuss.

First, what were the objectives of the Division of Highways in undertaking a speed control program? What was it striving to accomplish? Second, what was done toward accomplishing this end? Finally, the crux of our problem: How effective has this program been?

Of course, the first objective was mandatory in nature. It was to ascertain that new signs were erected in the field to inform motorists of the new limits which were applicable statewide. Formerly, other than at ports of entry into the State, no general speed limit signs were posted. Some 2,500 new 3′ x 3′ signs and 6′ x 6′ signs were erected in two weeks' time.

Since the law simply substituted a maximum statutory limit for "reasonable and proper" judgment for passenger cars in rural areas, and for trucks raised the statutory limits, speed zoning in all areas was not necessary; nor was it necessary to investigate new areas promptly. Furthermore, although many miles of highway in the State are of substandard design when compared to present-day requirements, since they had not been zoned previously, the law did not require that immediate action be taken.

Hence, the first objective was accomplished in a relative short period of time.

The second, third, and fourth objectives are, in reality, one; by accomplishing one, contribution is made to the accomplishment of the others. Separately, they were: (1) to ascertain that speed zones established prior to July 1, 1957, the effective date of the new law, were *not* in conflict with the new law, (2) to modernize the unrealistic and ridiculously low limits and to bring them up to accepted standards, and (3) to establish new speed zones with proper values where needed.

These objectives may be summarized by stating the aim of the Division of Highways which is as follows: To establish and maintain speed zones on State highways so as to gain the highest degree of respect for the regulation by making them realistic and enforceable, and at the same time create safe conditions within the zones without unnecessarily impeding vehicular traffic; in short, to create safer operation on our highways while still providing for rapid transportation.

In the mechanics of establishing speed zones and putting them into operation, the Division of Highways set up these requirements: (1) Select a speed which will seem reasonable to the average careful motorist, (2) Post all limits clearly and uniformly, (3) Attempt to gain the approval of the zoning by the local authorities, and understanding by the public, (4) Appeal to local and State Police for proper enforcement.

By the nature of the beast, the most important item of this operational program was the selection of speed.

Selection of Proper Speed

Probably the most controversial item today is the selection of proper operating speeds of motor vehicles. The only agreement seems to be that the proper speed be reasonable. Here again, what is reasonable and for whom is it reasonable? A speed that may appear reasonable to a motorist operating upon an arterial street or through highway, certainly is hazardous to an old man living across the roadway who goes to the supermarket once or twice a week. And vice versa, a speed limit posting low enough to satisfy the old man would be ridiculous to the motorist.

Much work is being done in many nation-wide areas toward establishing

proper speeds within speed zones. The Institute of Traffic Engineers has a committee on the development of warrants for vehicular speed zoning. Here at the University of Illinois a research project is being sponsored jointly by the Division of Highways, the University of Illinois, and the Bureau of Public Roads, and has been in progress for over two years. A portion of this program is devoted to developing warrants and criteria for establishing vehicular speeds within speed zones.

The Division of Highways has developed a policy for use in establishing speed zones, entitled "Procedures and Policies for Establishing Speed Limits on the Streets and Highways." This pamphlet contains sufficient information to guide all authorized governmental agencies in establishing speed zones, and lists methods for conducting speed studies, test runs, and warrants.

Speed Signs

Having discussed the selection of the proper limits for speed zones, we can pass on to the second item in the operational program, posting of signs. The posting of adequate speed limit signs is very important. If the signs are not adequate to sufficiently inform motorists of the applicable speed limits at all times, the speed zone will not gain public acceptance.

To mention a few of the signs used on Illinois highways and the basic principles followed by the Division of Highways in posting them: First, motorists are warned of the approach to a zone by means of a sign reading, "Speed Zone Ahead." Directly beneath this sign is another smaller sign which gives the miles per hour value of the zone; it is considered an advisory sign only. This sign assembly is placed approximately 1,000 feet in advance of the beginning of the zone, and should permit a motorist to adjust his rate of travel so that he may enter the zone at the proper speed.

The majority of speed limit signs contain a single number. When a sign contains a single numerical value, the posting is applicable to all vehicles traveling within the zone whether they be passenger cars, trucks, or buses. Of course, when different limits apply for the various types of vehicles, the limit applicable to each type of vehicle is indicated on the sign.

In order to give greater emphasis to the speed limit sign, the respective sizes of the signs have been increased. This was done with the hope that larger signs would more adequately convey the proper information to the motorist, stressing the exact speed at which he should travel.

An experimental installation was made of the larger sized speed limit signs in advance of signalized intersections on Route U. S. 66. Formerly, signs 24″ x 30″ were used. These signs were increased to a size 36″ x 48″. Speed checks through the area indicated an average reduction in the 85-percentile speeds of 2.7 mph; and police records indicated that the number of arrests were reduced two-thirds.

So much for the operational aspects of the program. Let us pass on to the priority given the respective zones studied and dwell upon the studies made.

Speed Zone Studies on State Highways

Prior to July 1, 1957, there were 4,258 speed zones in effect on Illinois highways outside the City of Chicago and on the Expressways in the metropolitan area. Since the new law called for a re-evaluation of all of the speeds within the respective zones, it is obvious that priority of action had to be established. Moreover, since several objectives were to be accomplished simultaneously, the logical order was that first things must come first.

With variations in several of the Highway districts, the general priority appeared to be as follows: Areas with decidedly low postings where enforcement was strict, were studied first. Next, speed zones on more important routes or on higher-volume routes, approaching major cities, were studied, and then, speed zones on routes entering or within municipalities, with priority based upon critical need.

The respective districts, as a general rule, based their method of approach or need for studying the zones on previous knowledge of critical conditions of the respective areas, visual inspections, or trial runs. Three districts removed the former 20 mph and 25 mph signs, and permitted 30 mph statutory limits to prevail prior to making the studies. All other districts made studies with the former signs in place. At the present time, outside of Chicago, 775 zones are yet to be re-evaluated or 18 per cent of the total. As may be seen, the program still continues.

Partly as a means of expediency and expediting the work in the field, and partly as a means of reducing the task of revaluating the speed zones which were in effect at the outset of the new law, and at the same time, in an effort to give legal status to the many zones that previously had been scientifically studied and established by the Division of Highways, the following interpretation was given the new law. Since the condition that zones were to be established "on the basis of engineering and traffic investigations" was contained in both versions of the law, and since there was no change in this particular power granted to the Department, and further, since the fact was apparent that few changes would be necessary in the postings in the field if revaluated, the Division felt that it was consistent to continue with existing limits in many of the zones until such time that the zones could be restudied and revised.

At present, the Division is being urged to complete the revaluation of the existing speed zones as soon as practical. Both local and State Police are enforcing speed limits on State highways as they are posted. It is impractical for either to confine their enforcement activities only to zones that have been studied or revised. Consequently, many unjustified arrests have been made.

On the other hand, cases involving prosecution for violation of speed limits in speed zones that have not been revaluated frequently are dismissed by the courts. The results are embarrassing to the enforcement officials and can seriously hinder their work in their enforcement efforts. Such action may well jeopardize the engineers' cordial relations with enforcement officials.

Attorney General's Opinion

Our informal interpretation of several sections of the law, and the experience of enforcement officials in having cases dismissed following arrests in posted zones, brings into the foreground a recent opinion by the Attorney General. A State's Attorney asked exactly what the local authorities are required to do under the new law before they can enforce limits of a speed other than the statutory limits provided in the Act.

I would like to digress from the main subject for a few minutes and dwell upon this opinion, because it is relevant to our discussion.

In what appears to be dictum, the

Attorney General volunteered the statement that "The local authority, whether county or municipal, may authorize the engineering or traffic investigation to be made pursuant to a contract with an outside agency." This statement may be of interest to those authorities who have no engineering staff within their organization to conduct the necessary investigations requisite to speed zoning.

Responding to a question concerning the legality of the former speed limit restrictions under the new law, which restrictions were based on prima facie limits of 20 mph in the business districts, 25 mph in residential districts, and 35 mph in suburban districts, the Attorney General stated flatly that the speed restrictions contained in the former law are now repealed.

One question concerns the former speed limit signs which remain in place. His response was as follows: "After enactment of the 1957 amendatory act, signs erected prior to the passage of said amendatory act and indicating a speed restriction different from that now set forth in the Act, should be removed from the streets or highways." In rather strong language, he continued: "The general speed restrictions now set forth *** are applicable, notwithstanding what may be stated on signs erected prior to July 1, 1957, on streets or highways." Then, these words of advice, which probably should be considered the rule for future conduct: "In the interest of proper law enforcement, it is believed that the local authorities should promptly have obsolete and incorrect signs removed from the streets and highways."

Although the above statements from the Attorney General's opinion do not apply directly to the Division of Highway activities, it can be considered as a guide to the proper action that should be taken. It also could be considered as a criticism of the past action of the Department, and a suggestion that more drastic action probably should be taken in the future.

The Attorney General makes this final comment which appears to be sound advice: "The local authority is under no obligation to utilize the provisions *** for the alterations of the general speed limits *** If it is not desired to have an engineering or traffic investigation, and to alter the general speed restrictions set forth *** then the *** (basic statutory limits) will be in full effect."

Effect of Speed Law Changes

Returning to the speed control program of the Division of Highways; the new speed limit law had been in effect for an 18-month period at the end of December, 1958. During this period, the Division of Highways established 228 new zones, raised 1,772 zones, lowered 312 zones, and checked 1,154 other zones which were not changed. In all, 3,466 zones were evaluated. This includes the activity in all areas in the State except Chicago and Expressways. After all these preliminary discussions and digressions, we are now ready to search for any apparent "effects" resulting from the changes in the respective speed zones.

There are several yardsticks or metering devices that may be employed to measure the reactions of the drivers in the respective zones. Included in the list are "before and after" studies that have been conducted by the Division; questionnaires to the respective District Highway Engineers; accident records; followed by complaints or acceptance by local people, and complaints or acceptance by highway users.

Before and After Study

The "before and after" study appeared to give most reliable data. After the speed limit law had been in effect for one year, and the Division of Highways had re-evaluated old zones and established new ones, on a scientific basis, approximately 2,000 in all, the Division of Highways was interested in knowing what had been accomplished. Therefore, a "before and after" study was conducted. The purpose of this study was multifold; among the objectives were (1) to determine, if possible, the effects of the speed zone program, (2) to verify predictions by the Department that the mere changing of the speed values on a speed limit sign would not necessarily increase or materially alter the overall speeds of traffic through an area, (3) to determine whether further changes need to be made to satisfy the existing traffic conditions, (4) to check the uniformity in establishment of speed zones throughout the State.

A total of 45 locations was surveyed in which the speeds of 24,341 vehicles were checked. This included 30 locations where zones had been raised, 11 where zones had been newly established, and 4 where zones had been lowered. In view of the fact that more adverse comments were generated by local officials when the boosting of a zone was considered, as opposed to favorable comments from motorists when speed zones were raised, greater consideration was given to the study of those locations where speed zones had been raised.

(1) Zones Raised

One individual check, made in northern Illinois, is typical of the results of raising speed zones on the basis of an engineering investigation.

A 30 mph zone was raised to a 40 mph zone. The area is classified by definition as a non-urban district. Before the zone was raised, the speed at or below which 85 per cent of the motorists were traveling was 38.9 mph. The data also revealed that only 26 per cent of the motorists were observing the posted speed of 30 mph. Moreover, the range of speed was 10 mph. These data indicated that the zone was ridiculously low in the eyes of motorists, and they were not voluntarily observing the posting. This original check of the 30 mph zone was taken on August 12, 1957. On June 4, 1958, ten months later, another check was taken at the same location and at the same time of day, after the limit was raised from 30 to 40 mph. The speed at or below which 85 per cent of the motorists were driving was 38.4 mph—0.5 mph less than motorists were formerly driving; the range of speed had been reduced to 8.9 mph, or a net reduction of 1.1 mph, and the posting was being observed by 92 per cent of the motorists.

Without going into details, this study of 30 zones raised revealed several facts of great interest. Among them are:

1. The summation of the 85-percentile speeds decreased 0.2 mph, from 42.6 to 42.4 mph. (See Figure 1.)
2. The speed differential, representing the range of speed of 70 per cent of the vehicles, the 85 percentile less the 15 percentile, was reduced from 11.0 mph to 10.7 mph. This indicates that a slight reduction in overtaking and passing maneuvers was accomplished.
3. Before the zones were raised, it was apparent that they were not respected by the majority of motorists because only 38.5 of every 100 drivers observed the limits; however, after the zones were raised,

the obedience rate increased to 84.6 of every 100, or 119 per cent.

4. Motor vehicle accidents showed a decrease after the zones were raised: they numbered 62 accidents before and 40 accidents after, or a reduction of 36 per cent.

(2) New Speed Zones

Consider the summary data for the 11 new locations, slightly different findings were apparent than from the study of the 30 locations where zones were raised. The outstanding fact from the data is that all recorded speed averages, as well as the speed differential (the 85-percentile speed less the 15-percentile speed) in the "after" study, were *less* than for the period before the zones were established.

Reductions in the various values were: (1) maximum speed, down 6.9 mph; (2) 95-percentile speed, down 4.8 mph; (3) 85-percentile speed, down 3.6 mph; (4) arithmetic average, down 3.7 mph; (5) 5-percentile speed, down 0.5 mph; and (6) differential, down 2 mph. The reduction in both the arithmetic average speed and the speed differential were due to the lowering of speeds in the upper brackets.

The accumulative speed curve for the "after" data as compared to the curve for the "before" data seemed to have reared back a bit. This was due to the "after" values being slightly less than the "before" values with greater decreases at the upper level of the plot and smaller decreases at the lower level.

The new speed limits were observed by 88 per cent of the drivers which fact indicates that the choice of the speed postings generally appeared to be reasonable and correct.

Accident data, although inconclusive, did show a reduction in number in the "after" study, as compared to the "before" study and indicated a favorable trend.

(3) Zones Lowered

The study of the 4 locations where speed zones were lowered is not considered as being conclusive of what has been accomplished in all such zones throughout the State. At best, the data may be looked upon as a check or cross-section study. However, the results definitely are representative and in line with the predictions of the Division of Highways, based upon past experience.

Here, it must be emphasized that in the "before" studies it was found that motorists were not operating at the former posted speeds. Consequently, these limits were not in line with conditions found to exist. "After" studies indicated that the behavior of the traffic followed a pattern very similar to the earlier pattern and the new posted speed had little apparent influence. A comparison of the accumulative "before and after" data shows that all items of consideration except one, were lowered, and except for lesser values, the "after" curve parallels the "before" curve. However, individual sites do not all follow this pattern, and fine distinctions are apparent.

The one item which showed an increase rather than a decrease in the accumulation data was the speed differential which was raised 1.3 mph; this increase would indicate a trend toward more overtaking and passing movements, and hence, an increase in the accident potential.

Another item was observance of the signs. Before they were lowered, the rate was 96.7 per 100 drivers; after, the observance was only 87.6 per 100. This slackening of voluntary observance could reflect active enforcement, and hence, in this respect, the results also seem to be in line with the prediction of the Division of Highways.

Again, accident records were studied, but the results were inconclusive; the "after" accidents were less, but not enough information to be of statistical value other than to indicate that they *had not* been increased, nor had they been lowered materially when the zones were lowered.

(4) Summary, Before and After Study

After discussing the results of raising and lowering the speed limits, and establishing new ones, when such action was based on engineering and traffic investigations, what over-all conclusions can be drawn?

We believe the benefits are clear. We call these conclusions benefits, because they seem to be on the credit side of the ledger insofar as the traffic engineer is concerned. They may be summarized as follows:

1. The physical changing of the numbers on speed limit signs, upward, will not of itself generate higher speed proportional to higher postings.
2. The physical changing of the numbers on speed limit signs, does not materially alter a speed pattern based on normal operation within a zone. When speed zones are raised, in many instances, the speed patterns are lowered.
3. Realistic speed limits make possible workable enforcement programs because they are observed voluntarily, and somewhat naturally, by the majority of motorists. As the result of this voluntary observance, enforcement activities may be directed to the small group of nonconformist and reckless motorists, and to the irresponsible driver who is the potential accident-prone driver, without persecuting the normally law-abiding motorist.
4. No evidence exists to indicate that accidents are increased when speed zones are raised, and by the same token, there is no evidence that accidents are materially reduced by establishing or lowering zones, although a downward trend is indicated.
5. New speed zones and zones with realistic speeds are appealing to motorists; they not only inform motorists of the legal speeds to travel within an area, but motorists tend to look upon them as guides to the proper speed they may safely travel through an area, taking away uncertainty of mind, and thus releasing driver tension.
6. The fact that motorists voluntarily and somewhat naturally observed the scientifically altered limits is evidence that the motoring public generally approves such zoning.
7. Since the same techniques adopted by the Department must be followed by local authorities in altering speed limits on streets and highways under their jurisdiction, it is reasonable to assume that in the new law, we have the machinery at hand to establish and maintain workable speed zones in all areas throughout the State, commensurate with traffic needs and safety.

Additional Facts

With the above conclusions showing the effects of the new speed law as determined from the "before and after" study, we may examine a few other remaining facts for evidence of changes, occasioned by the new law.

Although a speed control program was in effect by the Division under the former law, the limitations upon the zoning power of the Department pre-

vented the establishment of proper limits in many zones. For instance, at numerous locations, the Department was forced to establish zones due to high accident frequency or other causes —45 mph was the maximum limit that could be posted on conventional type highways. Numerous unsatisfactory zones resulted and the regulations were violated by as high as 90 per cent of motorists. The zones simply were unenforceable.

The new law has raised the limits to more reasonable proportions, thus making administration of the law both more positive and more flexible. The result is that former speed limits within speed trap ranges are being adjusted to more acceptable standards. Then too, the absolute limits, rather than the former prima facie limits, has put teeth into the law; and, together with their new electronic equipment, police are more capable and more enthusiastic about enforcing the realistic limits.

Very recently, the Bureau of Traffic was interested in learning of the general acceptance by *local authorities* of the speed zones altered or established under the new law. It canvassed the respective Highway Engineers for information since they had carried on the work in the field and had been in communication with the local authorities. This canvass was made just last month. In response to the question "What were the general reactions of the local authorities, etc.," the answer may be summarized thus: "The reaction of local authorities varied considerably. Zones lowered were accepted wholeheartedly with no comments; this appears to be the present natural reaction. Where speed zones were raised, the reaction was somewhat different; it ranged from complete understanding and agreement in the vast majority of cases, to doubt in others. While agreeing that the new limits appear to be reasonable, there were a few officials who felt that everyone will drive at the posted speed; others appeared willing to accept Department findings after the basic principles were explained to them."

The strongest opposition to changes in formerly posted limits came, as a general rule, not from local officials, but from private individuals who appeared to have special problems in mind. A number of complaints followed the usual pattern familiar to the traffic engineers, dubbing them ruthless savages and moral monsters.

In most cases, patience in explaining to the complainants both the provisions of the new law and the policies of the Department which were to be followed uniformly throughout the State and in all areas alike, afforded better understanding and final acceptance of the new limits. In numerous instances, the complainants were visited by representatives from the Division and in many others, traffic engineering investigations were made in the field in an attempt to arrive at, and correct, the real cause for the complaint.

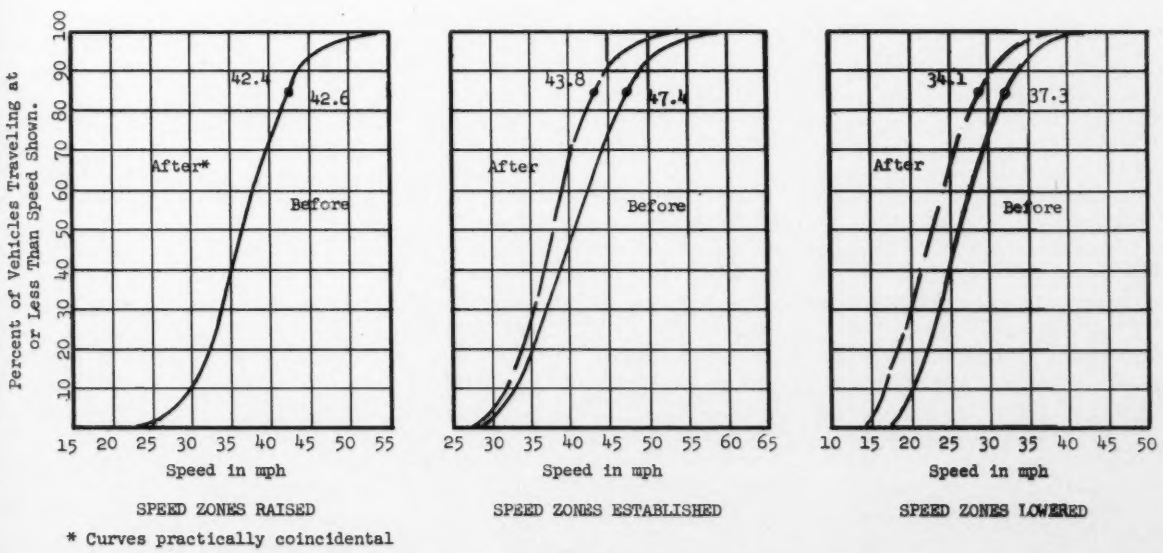
At the outset, the Division of Highways was forced to overcome a degree of general misunderstanding that was prevalent concerning the provisions of the new law. This misunderstanding became evident when engineering studies indicated existing zones were to be raised. Apparently to many partially informed persons, the principal reason for enacting the new law was to promote safety by a general reduction in speeds; they had not grasped the fact that a workable speed limit law was the principal objective of the legislature. Since a popular belief seemed to have existed that safety and slow speeds are compatible, and one is not possible without the other, there was bound to be apprehension.

Newspapers also were instrumental in advising the public of the efforts of the Department in carrying out the provisions of the new law, and citing instances of accomplishment. In numerous articles and editorials they helped pound out the theory prevalent among traffic engineers, but little understood by the public, that "to be best observed, our traffic laws must be realistic; that better observance and more goodwill, will result if speed limits are reasonable; and conversely, that violations and resentment will occur, creating ill will between drivers and enforcement officials, when speeds are posted at limits which the driver considers to be unreasonable."

Conclusions

Having gone through this maze of facts and statistics, I believe there is

(Continued on page 43)



* Curves practically coincidental

Figure 1

BEFORE AND AFTER STUDY — Graphs comparing speeds for all vehicles in zones on state highways that had been altered following engineering investigations. (Figures given are 85-percentile speeds.)

Uniform Street Sign Program for St. Louis

by Daniel J. Hanson
Traffic Commissioner
St. Louis County, Missouri

The author, left, and John J. Leslie, St. Louis County highway engineer, survey an installation of new reflective street signs at a rural intersection. In one year the county signed more than 500 intersections in the unincorporated area.

A GROUP OF far-sighted traffic engineers has instituted successfully a program for uniform street name signs for over 1,000,000 persons — almost 70 per cent of the population in the St. Louis metropolitan cluster.

This group, known as the Metropolitan St. Louis Traffic Engineers, hopes eventually to standardize all traffic control devices throughout the metropolitan area. They began with the street name signs in St. Louis County, an urban county which previously lacked uniformity of traffic control devices.

The City of St. Louis adopted identical reflective street signs and the cities of Berkeley, Ferguson and Bellefontaine also have embarked upon installation of uniform signs.

The program for standard street signs has gained momentum since its inception in 1957, and it is apparent that many more county municipalities, representing the remaining 30 per cent of the area population, will adopt the standards recommended by the group of traffic engineers.

In 1957, John J. Leslie, St. Louis County Highway Engineer, initiated the program when he requested that the county allocate funds for updating street name signs in the unincorporated portions of the county.

With $30,000 earmarked for the first phase, minimum standards were determined on the basis of the established color combination for interstate directional and informational signs — white letters on a green background. Reflectivity for night visibility was considered a basic requirement and was written into the specifications, which were endorsed by the Metropolitan St. Louis Traffic Engineers.

With their endorsement, the program was presented to the St. Louis County League of Municipalities, to which 70 of the municipalities belong. The League has gone on record endorsing uniformity for *all* traffic control devices.

St. Louis County's Division of Highways and Division of Traffic, acting as a clearing house for these municipalities, are helping each community with its specific problems and the details involved in updating its street name signs.

By the fall of 1958, the county signed more than 500 intersections in the unincorporated area. The City of St. Louis, with an area of 63 square miles and more than 1,100 miles of streets, will spread its street sign program over several years.

St. Louis County is accomplishing approximately 30 per cent of its street signing each year over a three-year period. The Highway Division expects to complete its program in 1960.

The county planning commission will soon issue new sub-division regulations requiring each contractor to install street name signs at each intersection

St. Louis County's uniform street signs have white letters on a green background. Fully reflective, these signs are brightly visible in automobile headlights at night — a feature which makes them especially effective on unlit country roads.

in his development in accordance with the county highway engineer's specifications. This signing must be accomplished before the county will accept these streets for maintenance purposes.

The success of our uniform signing program hinged entirely upon its acceptance by the municipalities. To ensure acceptance of the program, we had to develop specifications which were not only uniform and desirable, but *workable*.

Specifications

Minimum standard plates for the street name sign faces are 24 inches long and six inches wide. For increased target value, a sign plate 6¾ inches wide is recommended. Whenever the primary name contains eight or more letters consideration is given to increasing length of the plate to 30 inches.

Maximum sign plate length is 36 inches, and is considered for all pri-

A typical sign placement in the St. Louis metropolitan area. The county's street sign program, including that of the City of St. Louis, provides uniform signs for 1,000,000 persons, almost 70 per cent of the population in the St. Louis metropolitan cluster.

The same sign placement at night is vividly visible in the same shape and color at night. These signs serve to eliminate driver confusion—and dangerous indecision—at intersections after sundown.

mary messages exceeding 12 letters. Each sign plate is made back-to-back so the message is visible from both directions.

Primary message lettering is a minimum height of four inches, with the stroke and width of the letters conforming to the Bureau of Public Roads Manual. With a 6¾-inch wide plate the primary message is 4½ inches in height.

All letters are upper case with the prefix (i.e., N. S. E. or W. and suffix i.e., St., Av., Blvd., Rd., or Ct.) a minimum of 2½ inches high. Lettering is white on a green background, and both letters and background are fully reflectorized.

Placement Details

Whenever posible, sign plates shall be attached to existing vertical structures by wing-type mounts. In all other cases the plates shall be mounted on posts having a minimum diameter of two inches. Posts shall be at least 10 feet long, set in a concrete base.

Minimum height to the bottom of all signs shall be seven feet, determined as follows: In the case of a paved street or road, the bottom of the sign shall be seven feet above the top of

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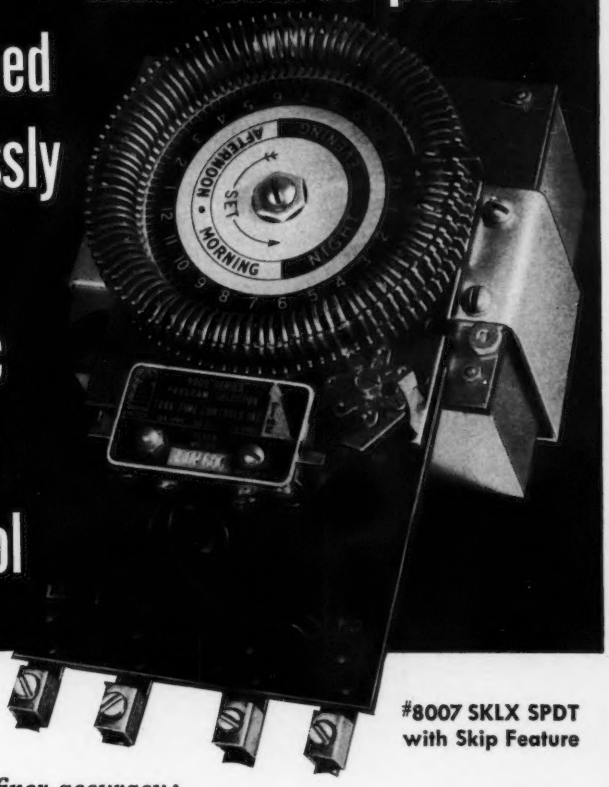

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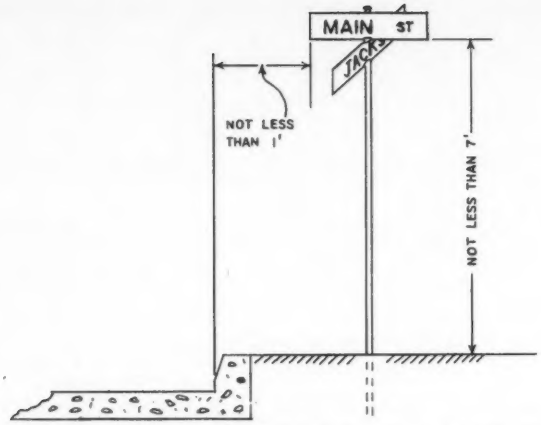
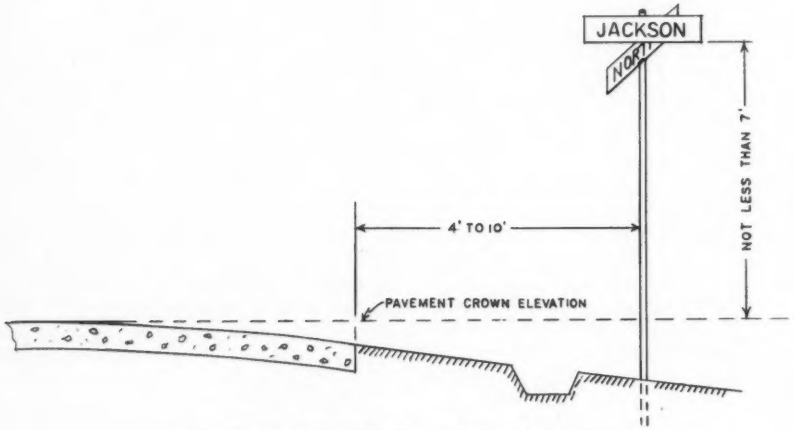


Typical placement of street name sign on paved street with curb. Sign is to be a far right indication on major street.



Typical placement of street name sign in rural area. Sign is to be a far right indication on major street.

the curb. In the case of a rural road, where the shoulder frequently slopes away from the edge of the pavement, the bottom of the sign shall be a minimum of seven feet above the crown of the road.

The placement of the street name signs shall be as a far right indication on the major street. The nearest portion of the sign shall be a minimum of one foot from the face of the curb or four to 10 feet from the edge of the pavement, where no curbing exists.

All through streets, major roads and divided roadways shall have two sets of signs per intersection. Residential streets usually require only one set. On all roadways with a pavement width of 60 feet or more, four sets of signs shall be required at each intersection.

Gaining acceptance of these specifications often is difficult. Several municipalities want to keep a particular design or color combination because they regard it as a mark of individuality. One municipality based the color combination of its signs on its high school colors.

While most municipalities are aware of the recommendations in the uniform manuals on traffic control devices, they are not bound by those recommendations. St. Louis County is one of the strongest "home rule" counties in the nation and the State Highway Department and County government have little or no authority within the corporate limits of the 98 municipalities.

However, the outlook for uniformity in traffic control devices is good. As the majority of the larger communities adopt a uniform sign program, it is believed that it will be accepted, eventually, by the smaller communities.

Our street name sign program in St. Louis County is the first big step in the right direction of uniformity for all traffic control devices in an urban county that previously had little or no uniformity—in fact very few signs.

Eventually, we plan to standardize all regulatory, caution, warning and information signs as well as traffic signal indications and pavement markings into a unified pattern.

Soon, we hope, a motorist will be able to drive from one end of St. Louis County to the other without being painfully aware that he has passed through a dozen or more municipalities—and passed perhaps a dozen confusing sets of signs.

Endorsed by the Metropolitan St. Louis Traffic Engineers, the uniform signing program was presented to the St. Louis County League of Municipalities, comprised of 70 communities. The League endorsed uniformity for ALL traffic control devices.

Coming Events

August 2-5—MUNICIPAL WORKSHOP ON PARKING —

Sponsored by Parking Committee, American Municipal Association. Carter Hotel, Cleveland. Contact: Robert J. Kelly, 1404 E. 9th St., Cleveland 14, Ohio.

September 7-11—ILLUMINATING ENGINEERING SOCIETY—

National Technical Conference, Hotels Fairmont and Mark Hopkins, San Francisco, California. Contact: IES, 1860 Broadway, New York, N. Y.

September 14-17 — INSTITUTE OF TRAFFIC ENGINEERS —

29th Annual Meeting, Commodore Hotel, New York, N. Y. Contact: ITE, 2029 K St. N.W., Washington 6, D. C.

September 20-24 — AMERICAN TRANSIT ASSOCIATION—

Annual Meeting, Hotel Leamington, Minneapolis, Minn. Contact: ATA, 355 Lexington Avenue, New York 17, N. Y.

October 11-16 — AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS—

Annual Meeting, Hotel Statler-Hilton, Boston, Massachusetts. Contact: AASHO, 917 National Press Bldg., Washington 4, D.C.

October 19-22 — INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION—

Annual Conference, Stardust Hotel, Las Vegas, Nevada. Contact: IMSA, 130 West 42nd St., New York 36, N. Y.

Traffic News

Pedestrian Safety Awards Presented by American Auto. Assn.

Two states and three U.S. cities have won top awards from the American Automobile Association for their outstanding efforts to save pedestrian lives in traffic.

They are: Detroit, Michigan; South Bend, Ind.; East Cleveland, Ohio, and the states of Connecticut and Michigan. All five won grand awards in the AAA national pedestrian safety program.

A total of 24 other U.S. cities won place awards, while four other states captured similar honors in the AAA program. Another 162 cities and three states were presented with honorable mentions or special citations, and eight state safety officials were cited by the Association for their efforts in the pedestrian field.

It was the third consecutive win for Detroit—a record in the 20-year history of the event. No other city has ever equaled this feat.

Citing the Motor City as a model for other U.S. communities, the AAA pointed to Detroit's 48 per cent reduction in pedestrian traffic deaths and 24 per cent drop in such injuries during the past three years. Since 1955, when Detroit started its intensive war on pedestrian mishaps, the death rate involving the man afoot has dropped from 8.6 per 100,000 persons to 4.3.

The AAA commended Detroit on its well-balanced pedestrian program which includes an outstanding accident records system, selective enforcement and concentrated effort on safety education in the schools.

In announcing the award winners, Frederick T. McGuire, Jr., AAA president, paid tribute to the pedestrian safety efforts of American cities as a whole and reported such fatalities dropped to an all-time low last year.

When the AAA program was launched in 1937, a total of 15,500 pedestrians were killed in traffic accidents, as contrasted with a toll of 7,800 last year.

"This is an enviable record," said Mr. McGuire, "and due credit should go to the outstanding pedestrian efforts of school officials, traffic engineers and police throughout the nation."

Competition for the top awards was the most spirited in the history of the program with a total of 1,668 cities and 43 states submitting reports to the AAA for analysis and scoring.

In selecting the winners, the judges used two formulas, one for the cities based on population and another for the states based on population, motor vehicle registrations, weather conditions and other factors. Cities then competed against others in their own population group, while the states competed against others in their class, with the grand award winner picked from the top states in each group.

Detroit won out over all other competing cities of more than 200,000 population. South Bend was a winner for cities of 50,000 to 200,000 population, and East Cleveland was selected from among cities under 50,000 population.

While Connecticut and Michigan tied for the grand award among the states, Kansas and Delaware were also selected as first place winners in their own groups. Other first place winners among cities include: Cincinnati, Ohio (500,000 to 1,000,000 population); Indianapolis, Indiana, (200,000 to 500,000 population); Roanoke, Virginia (50,000 to 100,000 population); a tie between Niles, Michigan and St. Joseph, Michigan (10,000 to 25,000 population), and a tie between Hastings, Michigan, and Webster City, Iowa (under 10,000 population).

Judges in the event were: E. H. Holmes (chairman), Assistant Commissioner for Research, U.S. Bureau of Public Roads; David M. Baldwin, Executive Secretary, Institute of Traffic Engineers; J. W. Bethea, Executive Secretary, The President's Committee for Traffic Safety; Basil R. Creighton, Assistant Executive Director, American Association of Motor Vehicle Administrators; E. Glenn Featherston, Assistant Commissioner, U.S. Office of Education; Carl E. Fritts, Vice-President for Engineering, Automotive Safety Foundation, and Leroy E. Wike, Executive Secretary, International Association of Chiefs of Police.

Motor Vehicle Travel Data for 1957

The average motor vehicle traveled 9,571 miles in 1957, almost half of it in cities, and got 12.47 miles per gallon of fuel, according to figures released by Bertram D. Tallamy, Federal Highway Administrator. The travel data were compiled by the Bureau of Public Roads, U. S. Department of Commerce, from studies conducted by the State highway departments.

Total motor-vehicle travel in 1957 amounted to 647 billion vehicle-miles. For 1958 the total is estimated at 665 billion, and nearly 700 billion is forecast for 1959. If such figures defy comprehension, picture a convoy of 400 vehicles leaving Portland, Maine, for Portland, Oregon. Lined up two abreast, bumper to bumper, the convoy would be 8 blocks long. Now im-

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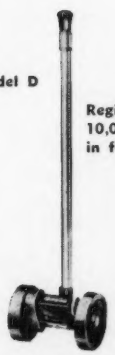

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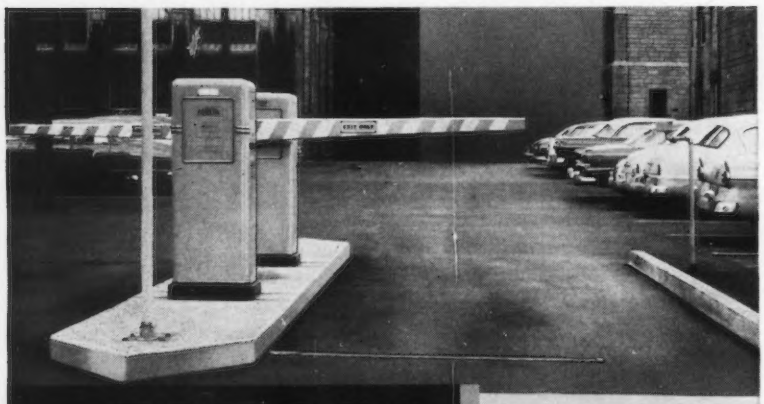

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agine such convoys taking off on the cross-country trip, one every minute, day and night, throughout the entire year: that's 700 billion vehicle-miles.

Of the 1957 travel, 40 per cent was performed on main rural roads, comprising 16 per cent of the nation's total of 3.4 million miles of roads and streets. Another 46 per cent of the travel was on urban streets, which comprise only 11 per cent of the total mileage. Local roads, which make up 73 per cent of all mileage, accounted for only 14 per cent of the travel.

Passenger cars represented 83 percent of the vehicles and performed 82 per cent of the travel; trucks and combinations accounted for 16 per cent of the vehicles and 17 per cent of the travel; similar figures for buses were less than 1 per cent.

The average passenger car traveled 9,391 miles in 1957 and consumed 652 gallons of fuel at a rate of 14.40 miles per gallon. The average truck or combination traveled about 10 per cent more, or 10,328 miles, but consumed twice as much fuel, 1,312 gallons, at a rate of 7.87 miles per gallon.

All of these data are based on comprehensive studies made by all States in connection with the highway cost allocation study undertaken by the Bureau of Public Roads. An extensive report on motor vehicles and highway travel, resulting from the study, was recently presented to the Congress.[1]

For a number of years the Bureau of Public Roads has compiled annual motor-vehicle travel data, which have been published in *Public Roads* magazine.[2] The new comprehensive studies by the States have made possible a broader, much more reliable base for the estimates. The total travel of 647 billion vehicle-miles for 1957 indicates an increase of 3.05 per cent over the 628 billion reported for 1956, while the formerly used trend calculation would have put the increase at 2.35 per cent. The small difference substantiates the general reliability of the trend calculations through the previous years. However, it now appears that the proportion of truck travel and the proportion of travel on local rural roads had both been slightly over estimated.

(Continued on page 58)

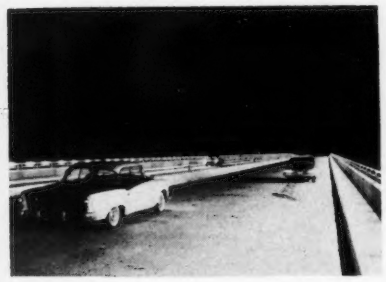
1 Third Progress Report of the Highway Cost Allocation Study, House Document 91, 86th Congress, 1st Session. Available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at 35 cents per copy.

2 The last article, for 1956, appeared in *Public Roads*, vol. 29, No. 11, December 1957.

Strictly Business

Unique "Waist-High" Roadway Lighting

Beach-bound motorists in New Jersey will now have proper illumination across the new $12 million Manahawkin Causeway Bridge. A unique "waist-high" fluorescent roadway lighting system emanates from 768 General Electric luminaires mounted in the aluminum railings just 50 inches above the road surface. The extruded railings, elliptical in shape, provide a snug fit for the luminaires in the lower front quadrant.



Light rays are directed across the bridge's four lane concrete roadway at right angles to traffic. The 42-inch long fixtures are spaced about two feet apart along the 2,400-foot span providing an even illumination over the roadway.

Engineers of the New Jersey Highway Department reported tests conducted on the bridge served to "unreservedly confirm" the installation plans, completed in 1956. Experiments were conducted on this specific design as far back as 1954.

The unique lighting installation brings to realization a "pet idea" which State Highway Commissioner Dwight R. G. Palmer first conceived a decade ago.

The Highway Department listed several advantages of this low level lighting including elimination of glare, all light directed on the roadway leaving the parapet in shadows thus directing the drivers' attention to the roadway, greater effectiveness in fog, rain or snow because of the horizontal direction of the light, and easier servicing without any roadway obstructions since the lights are readily accessible from the bridge walkways.

ARCH STREET, PHILADELPHIA, PA. — In its efforts to combat increasing traffic volumes, the Department of Streets, Philadelphia, Pa., is availing itself of new methods and techniques as illustrated in the accompanying photograph. Arch Street, shown here, is a heavily travelled downtown artery which was bogged down in a morass of cars, trucks and trolley cars. Business suffered and properties deteriorated. Then trolleys were substituted for buses, the street was resurfaced and new mercury vapor lighting was installed. Traffic was changed to a one-way movement except for morning hours (as in photo) and traffic lines were painted and overhead lane signals were installed to channel the traffic flow. As a result, traffic has been flowing more freely and business has had a decided pick up. The all aluminum, tapered traffic signal supports were supplied by Pfaff & Kendall of Newark, New Jersey.

New Models of "A" Stand

Two additions to their line of "A" Stands have been announced by Eastern Metal of Elmira, Inc., 130 Harrison St., Elmira Heights, New York.

The new Eastern Metal Utility unit has a large free-swinging, double-faced, 18″ x 24″ sign. The free-swinging feature (used on all Eastern "A" Stands) gives excellent stability in high winds and traffic backwash. This stability is further increased by the use of legs on the frame. Another Eastern Metal feature is the patented Speed-E-Loc which locks the stand in place and by simply raising the lockpin the stand folds flat for easy handling and storage. This feature is also found on the Standard and Heavy Duty models. The Utility model is also designed to carry two brilliant red flags to command even greater attention.

The Eastern Metal Economy "A" Stand will fit the needs of many users who want a low-cost but durable, lightweight yet stable, unit. This assembly, as with the other three models, employs a bonderized welded steel "A" frame which supports a free-swinging, 18″ x 18″ steel sign for maximum stability. This model does not have the Speed-E-Loc and the sign is standard cut—not rounded. Provision is made for one flag.

All Eastern "A" Stands are designed for high visibility under all conditions. The rust-proof frame is welded steel in bright red and the signs are lettered on both sides (except the Economy model) in bold black which is silk screened on chrome yellow and, for long life and easy care Eastern Metal "A" Stands have a flexible baked enamel finish to resist wear, vandalism, stone bruises and rough usage.

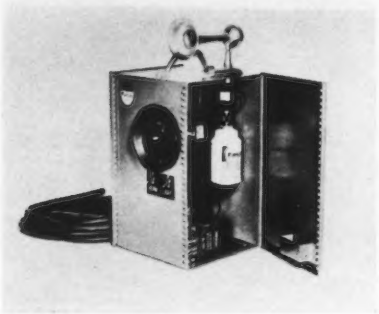
The Standard and the Heavy Duty models of the Eastern "A" Stands will continue to be available.

Traffic Flasher Alarm

Highway crews are given double protection against the hazard of oncoming traffic by the Falcon "Traffic Flasher Alarm," a new "Sounds for Safety" product introduced by the Falcon Alarm Co., Inc., 243 Broad St., Summit, New Jersey.

To a flashing red warning light the new Falcon highway safety device adds a loud warning horn. This horn

is triggered when the vehicle overrides the light and runs over an air hose placed ahead of a closed lane. The loud blast of the horn not only warns the motorist to slow down and move over, but gives warning up ahead to construction and maintenance crews, utility men, police at the scene of an accident, etc., allowing them time to get out of the way.



The Falcon horn and warning light are combined in a compact unit that is portable, durably constructed and waterproof. The horn is mounted on a rugged steel box container that measures approximately 10 x 10 x 15 inches high. This box houses the light, a standard lantern battery by which the light is powered, and the horn operating mechanism which includes a replaceable can of Freon by which the horn is powered. A separate compartment with hinged cover contains the air hose and extension wire. A hinged cover on the opposite side provides convenient access to other components for inspection and battery replacement. Exterior toggle switches allow independent operation of horn and light as desired. A carrying handle makes the unit easy to lift in and out of cars and trucks and easy to carry about.

Hinged openings are fitted all the way around with a neoprene gasket for tight waterproof closure. The light mounting is also sealed with neoprene and, for rust-resistance, the horn is plated and the box, which has a hammertone finish, is gray enameled.

Road Marking Gun

A new road marking spray gun designed to perform highway striping at speeds up to 25 miles per hour has been introduced by Binks Manufacturing Company, 3114 Carroll Ave., Chicago, Illinois.

Designated the Model 33 gun, it has a capacity of five gpm and will lay down a stripe up to ten inches in width. Smaller width stripes can be obtained by varying the distance of the gun from the highway.

Designed specifically for road marking materials, the gun is ruggedly constructed of heavy brass bar stock to withstand the shocks and rigors of everyday highway usage. Yet size is held down—total dimensions are 10 x 2 x 2 inches.

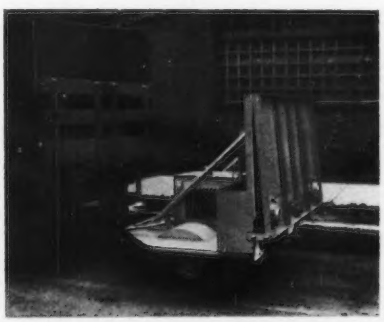
For operation, the Model 33 gun requires 15.5 cfm of 50 pounds air pressure, and 50 pounds material pressure. Needle valve opens at 45 pounds cylinder pressure.

Wald Develops New Portable Barricade

A new portable barricade for use in accidents and other emergencies, and for routine maintenance where traffic is involved, has been developed by Wald Industries, of Huntingdon, Pa. The highly compact trailer unit has a self-contained gasoline generator that provides power to operate warning blinkers, floodlights and power tools.

The new units, named Electricades, can be towed quickly by car or truck to the scene of an emergency and put into operation in a few moments. Panels unfold to present a highly reflective barricade with sealed-beam warning flashers. Messages for the face of the panels, to direct traffic, are readily interchangeable. While a primary use of the unit is to provide power for repairs in addition to serving as a warning barricade, the Electricades can be put into operation, locked to prevent tampering, and left unattended for several days at a time.

Two models of the Wald Electricade have been produced. The Senior (Model 2000 W) is fitted with a 2000-watt generator that operates flashers, floodlights and practically any power tools. It is designed primarily for toll roads and expressways, state departments, large cities and armed forces installations. The warning flashers



draw only 100 watts, leaving 1900 watts for other power needs.

The Junior Electricade (Model 500 W) is a more compact unit. It has 25 per cent of the generating power of the Senior model, and is extremely useful as a warning medium, for it is fitted with warning flashers and reflectorized panels, and can continue its warning function up to 90 hours without interruption. With flashers in operation, it still allows 400 watts of power for other equipment.

Service departments equipped with the Electricades are ever ready to move fast in emergencies, and to expedite routine maintenance projects. The portable units are versatile, and are equally as valuable for utilities, fire and police departments, road contractors and municipal airports as they are for city and state highway departments.

New Flex-O-Guides Prove Selves in Traffic

A new way of marking lanes, median strips, and to control movement of traffic on highways or parking lots has been introduced by Bell & Gustus, Inc., 4328 N. Elston Ave., Chicago, Ill., specialists in traffic control work. The new guide posts are called Flex-O-Guides and have the apearance of heavy steel, but actually are made of special reinforced rubber. Tests have proved that Flex-O-Guides can withstand auto impact at 70 m.p.h. and that they hold shape and height even after being rolled over by trucks, according to the manufacturer. Installations have been made in several cities and highway departments to date.

Three types of installations are available—they are in heights of 14″, 20″, and 26″, and can be installed in only

a few minutes for either permanent or "snap-in" and "snap-out" operation. Wherever there is a change of flow or channeling of traffic involved, Flex-O-Guides have proved versatile and convenient. They are black banded with reflective yellow.

W. A. Porterfield Retires

The retirement of W. A. Porterfield (Mem. ITE), Vice President in Charge of Sales Promotion, has been announced by The Union Metal Manufacturing Company, Canton, Ohio.

Mr. Porterfield, who joined the organization in 1920, will continue as a Director of the Company and act on a consulting basis. Since 1932, Mr. Porterfield has directed Sales Promotion of the Company's street lighting pole, foundation pile and material handling container products.

Channel Tunnel Studies Enter Second Phase

Channel Tunnel route studies are entering their second phase as a British firm commisisoned by the English Channel Tunnel Study Group prepares to make borings deep into the bed of the Channel between Britain and France.

The borings will bring up samples from as much as 200 feet below the bed of the Channel. They are expected to confirm findings made by a U. S. company in 1958, using electronic equipment.

It has been determined that under the Channel are three layers of chalk over clay, which covers a layer of porous, water-filled sand. Only the lowest layer of the chalk is impervious to water and the problem is to find a route where this layer is thick enough to insure safe tunneling.

International Road Federation is cooperating in the studies and is represented on the English Channel Tunnel Study Group.

—*World Highways*

New Appointments

Heckmann Elected Vice President

The election of L. F. Heckmann to Vice President in Charge of Sales has been announced by The Union Metal Manufacturing Company.

A graduate of the University of Illinois, Mr. Heckmann joined Union Metal in 1937. During World War II he was Manager of Material Priorities and has since served as Manager of Street Lighting Sales, Assistant General Sales Manager and General Sales Manager. Prior to joining Union Metal he was Manager of Street Lighting Sales for The Westinghouse Electric Corporation.

Mr. Heckmann is a member of the Illuminating Engineering Society and Secretary of their Roadway Lighting Committee. He is active in the affairs of the National Electrical Manufacturers Assoc., presently serving on the Executive Committee of the Street and Highway Safety Lighting Bureau.

Gilliss Named Director Los Angeles Transit Authority

C. M. "Max" Gilliss, (Affiliate, ITE) has resigned as Road Commissioner of Los Angeles County to accept the position as Executive Director of the Los Angeles Metropolitan Transit Authority on July 1, 1959.

Mr. Gilliss became Road Commissioner of Los Angeles County on November 1, 1958. He has held highway and public administration positions since 1947 when he was appointed

Assistant Road Commissioner and Highways Administrator for Riverside County. Prior to entering public administration work, he was with International Business Machines Corporation as an Engineering Instructor and Sales Engineer. In this position he gained experience which he later found valuable in setting up tax allocation procedures for Riverside County. He went into state service from Riverside County in 1952 as a Special Representative for the Director of Public Works. In 1953 he became Assistant Deputy Director and advanced to the position of Deputy Director in 1955.

In 1957, Mr. Gilliss served as Legislative Staff Secretary for Governor Goodwin J. Knight who appointed him to the position of State Director of Public Works on January 1, 1958, making him not only the youngest director of any state department but also the head of the state's largest department. This position also made him secretary and technical expert to the State Toll Bridge Authority.

As head of the Metropolitan Transit Authority, Mr. Gilliss will direct the activities of a transportation system serving 141 cities and communities and reaching into four counties. Mr. Gilliss stated that for a mass transportation system to be successful in the Los Angeles Metropolitan area, "it will have to be an attractive, salable service. You can't force people on to any transportation system with a gun. You have to make them want it either because it's cheaper or more convenient than driving their own cars. And, divorcing Californians from their automobiles is no mean selling job."

In addition to holding an Affiliate membership in the Institute of Traffic Engineers, Mr. Gilliss is affiliated with the American Society of Civil Engineers, American Road Builders' Association, American Right-of-Way Association, American Society for Public Administrators, Western Governmental Association, American Public Works Association and International Accountants Society.

Mosher Elected President NSPE

Harold A. Mosher (Mem. ITE), assistant director for the Eastman Kodak Company, has been elected President of the National Society of Professional Engineers.

Mr. Mosher is currently serving as a National Society vice president for the Northeastern Region. A graduate of Occidental College at Los Angeles, he has been associated with Bell Telephone Laboratories in New York City, and Consolidated Film Industries in New Jersey.

Mr. Mosher has served as president of the Monroe County Chapter of the New York State Society of Professional Engineers, a member of the Board of Directors of both the State and National Societies, and is chairman of the NSPE Membership Committee. He is a member of the American Society of Mechanical Engineers and the American Society of Air Conditioning and Ventilating Engineers, and is president of the board of education in Irondequoit, N. Y.

Higgins Retires; Joins Asphalt Institute

Herbert C. Higgins, (Mem., ITE) who has been Engineer of Toll Facilities for the Washington State Department of Highways since February 1956, has retired from this position and will become District Engineer for the States of Washington and Alaska for The Asphalt Institute. Mr. Higgins has been with the Washington State Highway Department since June 1927.

A native of Washington, born in Vancouver in 1908, Mr. Higgins has held many high engineering positions with the State Highway Department, working in many facets of highway engineering. He was Office Engineer of the Statewide Planning Survey at its inception in 1936, in 1941 became Assistant Engineer of the Plans and Surveys Division, became Assistant Right

of Way Engineer in 1942, and Assistant Office Engineer for the headquarters office in 1946.

In 1948 he became head of the department's Traffic Division and served in that capacity until August 1952 when he was given the dual assignment as Office Engineer for the department and as first Secretary of the Washington State Highway Commission on its creation in 1951. He continued as Secretary of the Commission until 1953, and as Office Engineer until he became Engineer of Toll Facilities in February 1956.

Besides this work, he has, at the last 10 biennial sessions of the Washington State Legislature, represented the Highway Commission, the Highway Department and the Washington State Toll Bridge Authority.

Higgins is a Member of the Institute of Traffic Engineers, has been president and vice president of the Institute's western section, and was a member of the national Board of Direction for three years. He is a member of the Northwest Society of Highway Engineers, and Southwest Washington Professional Engineers Association, the Highway Research Board and the American Road Builders' Association.

Keefer Named Study Director Pittsburgh Area

Mr. Louis E. Keefer (Associate Member, ITE) has recently been named as Study Director of the Pittsburgh Area Transportation Study, a two-year transportation planning agency sponsored by the State of Pennsylvania, Allegheny County, and the City of Pittsburgh, in cooperation with the U. S. Bureau of Public Roads.

Prior to this assignment, Keefer served as Assistant State Traffic Engineer for the West Virginia State Road Commission, as Assistant Planning Engineer for the Florida State Road Department, and as Traffic Engineer for the Chicago Area Transportation Study. He was appointed Acting Study Director of the Pittsburgh Area Transportation Study late last year.

After taking his master's degree in economics at West Virgnia University, he was an Automotive Safety Foundation Fellow at the Yale Bureau of Highway Traffic in 1954-1955. He serves on the Highway Capacity and Quality of Urban Traffic Service Committees of the Highway Research Board, and until recently, served on the Airport Parking Committee of the ITE.

Fred J. Meno II Honored in Detroit

Fred J. Meno II, (Assoc. Mem., ITE), Electrical Engineer for the Public Lighting Commission, City of Detroit, has been elected President of the Engineering Society of Detroit. He has been a member of the Board of Directors since 1957 and has held the offices of Assistant Treasurer and 2nd Vice President.

Mr. Meno joined the Society in 1937 and has been active in Detroit engineering circles for many years. Some of his other activities include membership in the International Municipal Signal Association, Past President of the Midwestern Section, and Chairman for nine years of its Traffic Control Devices Committee; Associate member of ITE and past Department Head of its Traffic Control Devices section; also a member of the Traffic and Operations Committee of the Highway Research Board of the National Academy of Sciences, and member of the U. S. National Committee on Standardization of Signal Light Colors.

Title Changes

John R. Crosby—is now Traffic Engineer for the New Jersey Turnpike Authority in New Brunswick, New Jersey; was Assistant Traffic Engineer.

Job Changes

Sherwood H. Hiller—formerly Assistant Traffic Engineer with Florida State Road Department of Tallahassee, Florida; now Traffic Engineer with the City of Tampa, Florida.

L. T. Scott-Smith—formerly City Plan Engineer with City of Waterbury, Connecticut; now Consultant at his home address of 59 Robinwood Road, Waterbury, Connecticut.

Robert F. Groby — formerly District Traffic Engineer with the Michigan State Highway Department in Kalamazoo, Michigan; now District Traffic Engineer in Cadillac, Michigan.

Edmund R. Ricker — formerly Traffic Engineer with the New Jersey Turnpike Authority; now Chief of Traffic Engineering Bureau, Pennsylvania Department of Highways in Harrisburg, Pennsylvania.

F. Norman Hill—formerly Vice President & General Manager of the Red Arrow Freight Lines, Inc.; now General Manager of the San Antonio Transit System in San Antonio, Texas.

Ralph L. Fisher Wins Award

Ralph L. Fisher (Mem., ITE), Assistant Supervising Engineer of the New Jersey State Highway Department, has been named recipient of the 1958 Annual "Getting Results Through Traffic Engineering" Award of one hundred dollars and a framed certificate.

Mr. Fisher submitted an example of the value and effectiveness of directing traffic into desirable channels or paths on a heavily traveled, high speed, limited access highway.

The Board of Judges was comprised of M. L. Shadburn, State Highway Engineer, Georgia State Highway Dept., representing AASHO; William J. Miller, Jr., Deputy Chief Engineer, Delaware State Highway Dept., representing ITE; Ray Ashworth, Director Northwestern University Traffic Institute, representing IACP; Murray D. Segal, Traffic Engineer of the National Safety Council; and Thomas J. Seburn, Associate Director, Bureau of Highway Traffic of Yale University.

GRADUATING HIGHWAY TRAFFIC ENGINEERING CLASS OF 1959, YALE UNIVERSITY

New Publications

Travel Characteristics In Urban Areas

Highway Research Board, National Academy of Sciences — National Research Council, 2101 Constitution Ave., Washington, D. C.—Bulletin 203, 130 pp., $2.60.

This bulletin contains seven papers given in a session sponsored by the Committee on Origin and Destination Surveys at the 37th Annual Meeting of the Highway Research Board, as follows:

"Travel Characteristics of Two San Diego Subdivision Developments," by Edward M. Hall.

"Factors Affecting Trip Generation of Residential Land Use Areas," by Gordon B. Sharpe, Walter G. Hansen and Lamelle B. Hamner.

"Forecasting Peak Hours of Travel," by Alan M. Voorhees.

"Transportation Usage Study," by William J. Mortimer.

"Evaluating Trip Forecasting Methods with an Electronic Computer," by G. E. Brokke and W. L. Mertz.

"Center City Goods Movement: An Aspect of Congestion," by Edgar M. Horwood.

"Travel Patterns in 50 cities," by Frank B. Curran and J. T. Stegmaier.

Better Driving

By Edward W. Pepyne, William A. Mann, Horace C. Hartsell; published by Prentice-Hall, Inc., Englewood Cliffs, N. J., 130 pp., $1.60.

This book reflects the thinking of over sixty of the nation's leading highway traffic authorities. Basic concepts are given new perspective and dimension with a critical evaluation of the dynamic role that personality and attitudes play in determining driver behavior. Information and techniques presented in "Better Driving" are an excellent guide to safer, more enjoyable driving on our crowded highways.

Proceedings

"Planning for Urban Transportation" —2nd Annual Spring Conference of the Organization of Cornell Planners. College of Architecture, Franklin Hall, Cornell University, Ithaca, N. Y., 85 pp., limited supply, $2.

A booklet containing discussions on "Transportation as a Builder of Cities," "Trends in Urban Transportation," "Framework for Planning—Search for a Policy," "Land Use Planning in an Age of Changing Transportation Patterns," and "Metropolitan Transportation."

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Brochure on "Water-Sealed" Treadles
Taller & Cooper, Inc., Division of American Electronics, Inc., 75 Front St., Brooklyn, N. Y., 4pp., Free.

This brochure presents the company's line of "water-sealed" vehicle detecting treadles, giving detailed specifications; illustrations describe the full range of models and sizes. Single and two-contact detectors are available for traffic control, statistical traffic counting, drive-in theatre admissions control, parking facilities and other applications where accurate, continuous detection of vehicle passage is required.

Highway Laws—1958
Bulletin 205, National Academy of Sciences—National Research Council, 2101 Constitution Ave., Washington, D.C., 34 pp., $0.80.

A report of 1957 activities of the Committee on Highway Laws, as presented at the 37th Annual Meeting of the Highway Research Board, together with three papers sponsored by the Committee at the same meeting, as follows:

"Control of Access & Police Power," by Stanley Nissel.

"A Program of Highway Research at the University of Wisconsin," by J. H. Beuscher, Donald Heaney, Ray Vlasin, and Frank M. Covey, Jr.

"The Law and Highway Modernization," by Clifton W. Enfield.

Proceedings
26th Annual Meeting of the American Bridge, Tunnel, and Turnpike Association, Inc., P. O. Box 748, White Plains, N. Y., 1958, 154 pp., $5.00.

This publication is a full report of the 26th Annual meeting of the American Bridge, Tunnel, and Turnpike Association held in Richmond, Va. in October 1958. It contains papers, speeches and reports as well as membership lists of the Association.

Letter to the Editor

Dear Sir:

In Ohio we feel very strongly about uniformity in our Traffic Control Devices. Perhaps this is true because the State has had "home rule" with stronger local authority than most states, and there is much to be accomplished in overcoming the individuality still existing in the political units. Perhaps, also, it is the unifying force of the local chapter of the I.T.E. with its 1st president, the late Mr. Harold Eckhardt, the Author of the "State Uniform Manual on Traffic Control Devices." At any rate, we want uniformity.

Cleveland is justly proud that all its control devices are in compliance with the State Uniform Manual. All, that is, except one, and we look forward to the day when this exception will *be* the rule instead of proving it.

Cleveland's big exception is the "Illuminated NO LEFT TURN DEVICE." (Figure 1) With 56 per cent of the turn restrictions in the City on a strictly part-time basis, a better method than simple signing (Figure 2) is required. Throughout the city there are numerous instances where the secondary streets jog at intersections with arteries, and so there are a great number of part-time NO LEFT TURN restrictions, mostly during the rush hours.

In attempting to develop a good part-time device which would be both economical in its construction and clear and simple in putting the message across, there were many ideas tried and rejected.

In 1953-54 Vurnen Johnson, the City of Cleveland Traffic Engineer and now

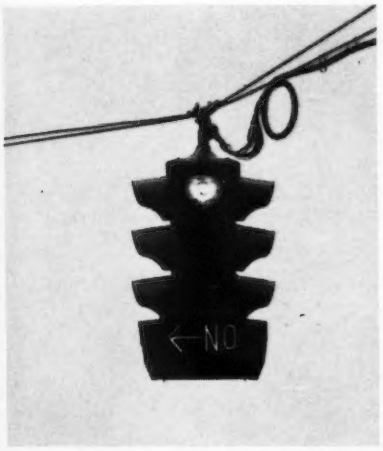
with the Cleveland Safety Council, worked along with a neon sign company and developed a neon NO with an arrow.

There was great concern among the engineering staff when the first installation was begun, but none of their fears materialized and the idea has rapidly spread to the surrounding municipalities.

Never have we seen a Traffic Control Device so quickly accepted and highly respected by both the public and the enforcement authority. The first complaint has yet to be recorded.

Cleveland now has 217 of the neon installations at 88 intersections. Within the year it is hoped that the installation will be completed at every part-time restriction intersection in the city.

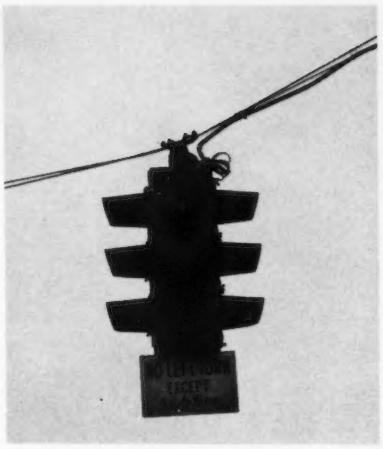
The device consists of a 16″ x 16″ x 8″ aluminum box which hangs below the signal. The neon letters are 5″ high, and red tubing is used for the "←NO." In the aluminum box is a G.E. 2-way transformer, 5000 volt, 30 m.a.



The control is located in the conventional signal control cabinet, and operates off a standard time clock or off the system program device.

Probably the greatest value of the device is not the evident acceptance and respect of the public, but the education of the public to the respect of the device. Doubletalk? No! People no longer have to read a sign, calculate the time, hesitate, and then begin a turning maneuver. Now they merely see the neon "NO" and take an alternate route. Total strangers understand it perfectly.

So it is that a little scheming between the traffic engineer and the local politicians can bring into effect those much desired restrictions which usually meet popular opposition. It often takes years to get the local elected representative to go along with a left turn ban. Less opposition is met when the left turn ban is in force only during the rush hours. Once his people become accustomed to the restriction it is a fairly simple matter to add a few minutes now and then to the clock. In Cleveland we don't even have to "sell" left turn restrictions to the Council any more.



Another, a rather novel, benefit to this device is the manual control. If a policeman discovers a particularly bad situation he merely throws the switch and lets the jam clear itself. When it is clear he puts the control back on the automotive cycle. If he forgets to turn it off there is a duration timer that turns it off. This feature has been useful especially in the outlying intersections on some of those balmy Summer afternoons when every registered vehicle in the State seems to be on the road. On those days no one seems to care if they have to drive a little further, just as long as they don't get stuck in long lines of congestion.

Our suburbs have begun to use the idea; the device is being advertised by several signal suppliers, and from time to time, we get a request for information about our installations. Now our hope is to see it described and recommended in the Ohio State Uniform Manual and ultimately in the Manual (national) on Uniform Traffic Control Devices.

Cleveland has pioneered the device. Let's hear some comment by other cities.

Sincerely,

ROBERT J. KELLY
Traffic Engineer
City of Cleveland

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erected with minimum traffic interference

There's no need to close lanes or reroute traffic when a Planet overhead sign is erected. When erection crews put the light-weight, all-aluminum overhead structure in place there is a minimum of traffic interference. Note that cross-member design permits several inches of tolerance if footings are not exactly aligned. These fast erection features substantially lower erection costs.

All-aluminum sign structures engineered by Planet are rugged. They offer maintenance-free support for large overhead signs and lights that will withstand hurricane force winds. No painting is ever required and there are no rust problems.

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• Engineered Handling Systems
• Automation Equipment

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COMPARATIVE HIGHWAY LIGHTING POLICY

STATES REPORTING	INCORPORATED AREAS (Cities or Towns)									UNINCORPORATED AREAS (Rural or County)									Special Conditions in Letter
	MATERIALS			INSTALLATION			MAINTENANCE			MATERIALS			INSTALLATION			MAINTENANCE			
	INTERSTATE	OTHER F.A. ROADS	STATE ROUTES	INTERSTATE	OTHER F.A. ROADS	STATE ROUTES	INTERSTATE	OTHER F.A. ROUTES	STATE ROUTES	INTERSTATE	OTHER F.A. ROUTES	STATE ROUTES	INTERSTATE	OTHER F.A. ROUTE	STATE ROUTES	INTERSTATE	OTHER F.A. ROUTES	STATE ROADS	
	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	BUREAU STATE LOCAL	
Arizona	X X	X X X	X X	X X	X X X	X X	X	X	X	X X	X X X	X X	X X	X X	X X	X	X	X	
Arkansas	X X			X X															X
California	X X	X X	X	X X	X X	X	X	X	X X	X X	X X	X	X X	X X	X	X	X	X	X
Colorado	X X	X X	X	X X	X X	X				X	25 75	25 75	X	25 75	25 75	X	25 75	25 75	X
Connecticut	X	25 75	25 75	X	25 75	25 75	X	25 75	25 75	X			X						X
Dist. of Columbia	X	X	X	X	X	X	X	X	X							X			X
Florida	90 10	X	X	90 10	X	X				90 10	X	X	90 10	X	X	X	X	X	X
Illinois	X X	X X X	X X X	X X	X X X	X X X	X	X	X	X X	X	X	X	X	X	X	X	X	X
Iowa																			X
Kansas	X X	X X	X X	X X	X X	X X	X	X	X	X X	X X	X X	X X	X X	X X	X	X	X	
Kentucky	X X	X	X	X X	X	X	X	X	X	X X			X X			X	X	X	
Louisiana	X X	X X X	X X	X X	X X X	X X	X	X	X	X X	X X	X	X X	X X	X	X	X	X	
Michigan	X X X	X X X	X X	X X X	X X X	X X	X	X	X	X X	X	X	X X	X	X	X	X	X	
Minnesota	X X	X X	X X	X X	X X	X X	X	X	X	X X	X X	X X	X X	X X	X X	X	X X	X X	
Montana	X X	X X	X X	X X	X X	X X	X	X	X	X						X			X
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Mississippi																			
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Ohio																			
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Rhode Island	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
South Carolina	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Tennessee	X X	X	X	X X	X	X	X	X	X	X X	X X	X	X X	X	X	X	X	X	X
Texas	X X X	X X X	X X	X X X	X X X	X X	X X	X X	X X	X X	X X	X	X X	X X	X	X	X	X	
Utah	X X	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X
Vermont																			
Virginia	X X	X X X	X X	X X	X X X	X X	X	X	X	X X	X X	X	X X	X X	X	X	X	X	
Washington	X X	X	X	X X	X	X	X	X	X	X X	X	X	X X	X	X	X	X	X	X
West Virgina																			X
Wisconsin																			
Wyoming	X X	X	X	X X	X	X	X	X	X	X X	X X	X	X X	X X	X	X	X	X	X
North Dakota	X X	X	X	X X	X	X	X	X	X	X X	X	X	X X	X	X	X	X	X	X
Indiana	X X	X	X	X X	X	X	X	X	X	X X	X	X	X X	X	X	X	X	X	X
Maryland																			
South Dakota	90 10			90 10			X									X			X
New Jersey	X	X	X	X	X	X	X	X	6444	X	X	X	X	X	X	X	X	X	X
Massachusetts	HAZARDOUS			AREAS ONLY						X X X	X X X	X	X X	X X	X		X	X	X
New York	X X X	X X X	X X X	X X X	X X X	X X X	X	X	X										

Note – Of the 41 states reporting, 10 states reported that as yet no formal policy has been adopted.

Compiled by the Department of Traffic Engineering, Utah State Road Commission—5-5-59.

Technical Notes

Reserved Transit Lanes

This Report of Committee 3-D of the Institute of Traffic Engineers has been accepted by the Technical Council and was approved by the Board of Direction on May 23, 1959 as an informational report.

Comments are requested from readers for the guidance of the Committee and the Technical Council.

Foreword

THE SEGREGATION of traffic by types to eliminate the friction and conflicts of purpose of the various classes of traffic that make up the traffic stream has been suggested frequently as a partial solution to traffic congestion in concentrated business areas of the modern city. The segregation of transit vehicles from other traffic to eliminate one set of interferences has likewise been proposed as a means of not only speeding up transit service in these areas, but at the same time, speeding up other vehicular traffic.

The Institute of Traffic Engineers' Technical Committee 3-D, Transit Traffic, has reviewed experiences and operating data in regard to "Reserved Transit Lanes" from cities with transit lanes and has developed warrants and operating criteria for the establishment and operation of such lanes. The committee believes these warrants provide a reasonable use of the reserved transit lane and do not conflict with the public interest. They are proposed with the test of reasonableness and fair play as a background of law.

Local conditions, in the various cities where these measures are being considered, would of course dictate the legal right of the city under its police powers to enact such regulation, the need, the location of the lane (curb or center), the hours (full time or part time) and other specific regulations that may be required to make operation of these measures successful. Any measure of this type must necessarily have full official and public support. It should *not* be concluded that the committee does not recommend the establishment of a transit lane under circumstances that do not meet the suggested warrants or under operational criteria that are at variance from those listed herein if such establishment may be otherwise justified with official and public support.

Report of Institute of Traffic Engineers' Technical Committee 3-D on Reserved Transit Lanes

1. Definitions

a. A *transit lane* is that portion of the roadway devoted entirely to the use of transit vehicles (1) in motion (2) in the act of receiving or discharging passengers, and (3) when stopped in response to street traffic controls. Other vehicles may enter, leave and cross this lane only when permitted (see paragraphs 3a(2), 3b(1), 3c(1) and 3c(5) but may not substantially interfere with the transit vehicle movement in the lane. Transit vehicles may use other street lanes on a street where a transit lane is established only when permitted (see paragraphs 3a(4), 3b (4) and 3c(6), but under no circumstances may they make service stops outside the transit lane. The purpose of the transit lane is to segregate transit traffic from other vehicles and to prevent interference of one by the other.

b. A *subject street* is a thoroughfare on which transit lanes are established or proposed for establishment.

c. A *transit vehicle* is a conveyance (bus or streetcar) used for the mass transportation of people. *Transit traffic* refers to the flow of mass transportation vehicles and/or passengers carried in such vehicles along a street or highway.

d. *Other vehicles* are all wheeled conveyances except transit vehicles. *Other traffic* refers to the flow of wheeled conveyances and/or passengers, other than that of transit vehicles.

2. Warrants

a. Warrants for a CURB Transit Lane.

(1) A curb transit lane is practical, under normal circumstances, at hours, or under access conditions, when curb access of vehicles to service abutting property can reasonably be prohibited.

(2) A minimum of 60 transit vehicles per peak hour, or 400 vehicles per 12-hour period, should use the transit lane to justify the lane's single use. The maximum transit traffic assigned to a transit lane should be limited to the number of transit vehicles and/or routes that can operate freely in the designated lane.

(3) Width of roadway must be sufficient for at least two lanes of travel in addition to the transit lane in the direction of travel of the transit lane. The capacity of these lanes should be adequate to serve the other traffic existing on the street.

(4) The number of transit patrons using transit vehicles in the subject street should equal or exceed 1.5 times the number of drivers plus passengers carried by other vehicles during the peak hour.

b. Warrants for a full time CENTER Transit Lane.

(1) When a center transit lane is provided, it shall be in operation at all times when transit service is provided on the subject street.

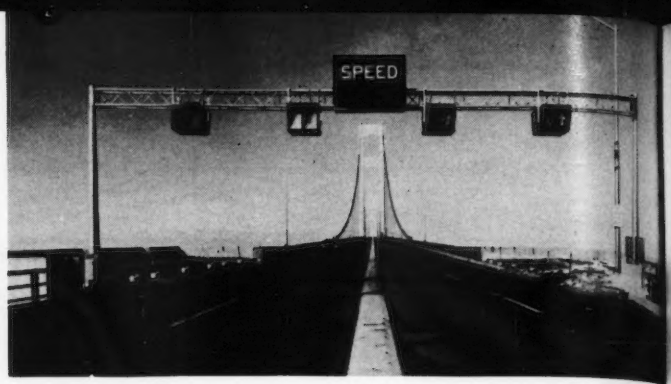
(2) A minimum of 75 transit vehicles per peak hour and 500 transit vehicles per 12-hour period per transit lane should use the lane to justify its single use. The maximum transit traffic assigned to a transit lane should be limited to a number of transit vehicles and/or routes that can operate freely in the designated lane.

(3) For one-way operation, the subject street should be of such width as to provide two lanes on either side of the transit lane, plus space for loading platforms. The total number of lanes should thus be five. Curb lanes are for parking or stopping vehicles and the two lanes adjacent to the transit lane are for moving traffic. The capacity of these lanes should be adequate to serve the other traffic existing on the street.

(4) For two-way transit lane operation a minimum of six lanes should be available — two transit lanes and four lanes for other traffic. Where transit lane operation in one direction only is desired on a two-way street, five lanes may be sufficient. The capacity of these lanes should be adequate to serve the other traffic existing on the street.

(5) The number of transit patrons in the peak hour using the subject street should equal or exceed 1.5 times the number of drivers plus passengers of other vehicles. The number of transit patrons in a 12-hour

Note ~ Of the 41 states reporting, 10 states reported that as yet no formal policy has been adopted.
Compiled by the Department of Traffic Engineering, Utah State Road Commission—5-5-59.



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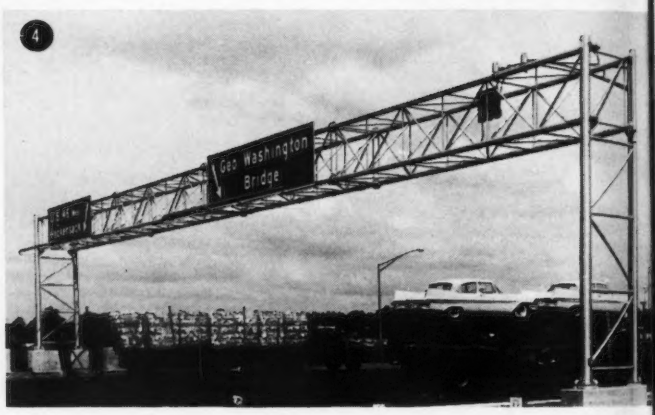

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1. INSTALLATION: 88'6" aluminum box truss sign span
OWNER: Richmond-Petersburg Turnpike Authority
LOCATION: James River Bridge
CONSULTING ENGINEERS: Parsons, Brinckerhoff, Hall & MacDonald

2. INSTALLATION: 56 foot aluminum box truss signal span
OWNER: State of Michigan, Mackinac Bridge Authority
LOCATION: Mackinac Bridge, St. Ignace, Michigan
CONSULTING ENGINEERS: D. B. Steinman

3. INSTALLATION: 90 foot aluminum box truss sign span
OWNER: North Carolina State Highway Commission
LOCATION: Interstate Route 40

4. INSTALLATION: 110 foot aluminum box truss sign span
OWNER: New Jersey Turnpike Authority
LOCATION: Exit 18, New Jersey Turnpike
GENERAL CONSULTANT: Howard, Needles, Tammen and Bergendoff
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period should be equal or greater than the number of occupants of other vehicles in the subject street.

(6) Other factors, such as length of street section, parking conditions, turning problems, loading and unloading situations, and general factors listed in section 3 (d) should be reviewed when such a lane is being considered.

c. Warrants for a part time CENTER Transit Lane.

(1) A center transit lane operating only at peak hours may be established on a one-way street having a minimum of three traffic lanes; and on a two-way street having a minimum of four lanes. The capacity of remaining lanes should be adequate to serve the other traffic existing in the street.

(2) A minimum of 60 transit vehicles per peak hour should use the transit lane to justify its single use. The maximum transit traffic assigned to a transit lane should be limited to the number of transit vehicles and/or routes that can operate freely in the designated lane.

(3) The number of transit patrons during the peak hour should equal or exceed 1.5 times the number of drivers plus passengers of other vehicles using the subject street.

(4) Other factors, such as length of street section, parking conditions, turning problems, loading and unloading situations, and general factors listed in section 3 (d) should be reviewed when such a lane is being considered.

3. Operating Criteria

a. Operating Criteria for a CURB Transit Lane.

(1) Turning movements of other vehicles should not interfere with the operation of the transit lane. Right turns from the subject street by other than transit vehicles may be provided for to the extent necessary for traffic circulation in a business street.

(2) At times when the transit lane is in effect, no other vehicles may use the transit lane except for turns, provided, however, that taxicab pickup and discharge may be permitted.

(3) Farside or midblock bus stops would permit the use of the transit lane for right turns.

(4) No transit vehicle may leave the transit lane except to make a turn, or in case of emergency, to pass a stalled vehicle.

(5) Two curb transit lanes should not be operated simultaneously on a two-way street. For streets wide enough to sustain two curb transit lanes under the requirement of 2a. (3), center transit lanes are recommended.

b. Operating Criteria for Full Time CENTER Transit Lane.

(1) On one-way streets other vehicles may use the transit lane within an intersection or after passing through the intersection for the purpose of weaving from one side of the transit lane to the other, provided such a maneuver can be made without undue interference or hazard and provided such vehicles leave the area of the transit lane as expeditiously as possible after completing the weaving maneuver.

(2) If two-way center transit lanes are proposed or established on a two-way street, left turns from the subject street should be prohibited to the degree required for operational needs.

(3) Nearside stops for transit vehicles should be used exclusively. Safety islands at the stopping place, for boarding and alighting passengers, must be provided. Ingress and egress to the safety islands should be permitted only at the nearside pedestrian crosswalk.

(4) No transit vehicles may leave the transit lane, except in emergency to pass a stalled vehicle, or to turn off the subject street. A transit vehicle leaving the subject street must leave the transit lane one block prior to making the turn, except in the case of a left turn from a two-way street or where provision is made in traffic control for the turn from the transit lane. It must not make a service stop on the subject street after it has left the transit lane.

c. Operating Criteria for a Part Time CENTER Transit Lane.

(1) On one-way streets, other vehicles may use the transit lane within the intersection or after passing through the intersection for the purpose of weaving from one side of the transit lane to the other, provided such a maneuver can be made without undue interference or hazard and provided such vehicles leave the area of the transit lane as expeditiously as possible after completing the weaving maneuver.

(2) Left turns should be prohibited from a two-way street with center transit lanes during the hours the lanes are in operation to the degree required by operational needs.

(3) Nearside stops for transit vehicles should be used exclusively. Safety islands at the stopping place for boarding or alighting passengers must be provided. Ingress and egress to the safety islands should be permitted only at the nearside pedestrian crosswalk.

(4) Under the roadway warrants in 2c(1) stopping, standing or parking of other vehicles must be prohibited, if such stopping, standing or parking would block a moving lane of traffic.

(5) During off-peak hours other vehicles should be permitted to use the transit lane. Transit vehicles should continue to operate in the transit lane and make service stops at the locations provided.

(6) No transit vehicles may leave the transit lane, except in emergency to pass a stalled vehicle, or to turn off the subject street. A transit vehicle leaving the affected street must leave the transit lane one block prior to making the turn, except in the case of a left turn from a two-way street or where provision is made in traffic control for the turn from the transit lane. It must not make a service stop on the subject street after it has left the transit lane.

d. General Factors.

(1) Where a transit lane is proposed, transit routes may be shifted from other streets to build up transit volumes on the proposed transit lane street to meet the aforementioned volume warrants, provided that such shifts do not exceed maximum capacity limitations set forth above and provided that transit patrons are not unduly inconvenienced.

(2) Use of the transit lane should speed transit service on the subject street. A decrease of 10 per cent in the running time of transit vehicles in the area where the transit lane is in effect is a sufficient reduction to warrant retention of the transit lanes.

(3) An elapsed running time survey should show no appreciable increase in running times of other vehicles on the subject street. However, if transit routes have been shifted from other streets to the subject street in order to meet volume warrants, a decrease in speeds of other vehicles may be tolerated, provided that studies confirm that the diver-

sion of transit vehicles from other streets has provided increased capacity and improved operating speeds of other traffic on these other streets.

(4) The transit lane is available for use by fire and police vehicles. Such use should be restricted to emergency calls only.

Extract from Journal of the Proceedings of the City Council of the City of Chicago, Ill.

Regular Meeting—Wed., May 9, 1956
(Page 2582)

"Mass Transportation Lane" and "Mass Transportation Vehicle" Defined; Regulations Prescribed for Use of Such Lanes.

The Committee on Traffic and Public Safety submitted a report recommending that the City Council pass a proposed ordinance transmitted therewith reading as follows:

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF CHICAGO:

SECTION 1. Section 27-1 of the Municipal Code of Chicago is amended by inserting in alphabetical sequence the following:

Mass Transportation lane. That portion of a roadway indicated for use by mass transportation vehicles.

Mass Transportation vehicle. A public passenger vehicle having seating capacity for 35 or more passengers.

SECTION 2. Section 27-39 of said Code is amended by adding thereto the following paragraph:

Where, in the opinion of the said commissioner, a separation of traffic is necessary to expedite the flow of traffic in a particular area, he may designate portions of roadways as mass transportation lanes, and when such lanes are so marked upon the roadways or otherwise so indicated by appropriate signs, it shall be unlawful for the driver of any mass transportation vehicle to use any other portion of such roadway, and it shall be unlawful for the driver of any vehicle other than a mass transportation vehicle to enter or use any such mass transportation lane.

SECTION 3. This ordinance shall become effective upon its passage and due publication.

On motion of Alderman Keane the committee's recommendation was concurred in and said proposed ordinance was passed, by yeas and nays as follows:

YEAS—48 NAYS—None

Membership of Institute of Traffic Engineers Technical Committe 3-D "Transit Traffic"

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D. Jackson Faustman
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Aluminum Company of America
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R. G. St. John, Representative

American Transit Association
355 Lexington Ave. New York 17, N. Y.
George W. Anderson, Representative

Automatic Signal Division Eastern Industries, Inc.
Regent Street East Norwalk, Conn.
Paul L. Green, Representative

J. E. Bauer Company
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Richard H. Clinton, Representative

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Wolf & Seventh North Streets, Syracuse, N. Y.
K. C. Eichelberg, Representative

Eagle Signal Corporation
Moline Illinois
W. H. Peterson, Representative

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835 North Wood Street Chicago 22, Illinois
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Econolite Corporation
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Aubrey Matthews, Representative

Electronic Signal Company, Inc.
139-05 Archer Avenue, Jamaica 35, New York
C. Grant McKenna, Representative

Flex-O-Lite Manufacturing Company
P.O. Box 3066 (Affton Br.) St. Louis, Mo.
Preston D. Law, Representative

General Electric Company
Outdoor Lighting Dept. Hendersonville, N. C.
W. E. Schwanhausser, Representative

Kerrigan Iron Works, Inc.
1033 Herman Street Nashville, Tennessee
E. W. Fitzgerald, Representative

Magee-Hale Park-O-Meter Company
Commerce Exch. Bldg., Oklahoma City 2, Okla.
G. A. Hale, Representative

The Marbelite Company, Inc.
175-179 N. 10th St. Brooklyn 11, N. Y.
William E. Lenz, Representative

Minnesota Mining and Mfg. Co.
900 Bush Avenue St. Paul 6, Minnesota
Donald O. Opstad, Representative

National Safety Engineers
P.O. Box 1069 Birmingham, Alabama
John E. Montgomery, Representative

Outdoor Advertising Association of America, Inc.
24 W. Erie St. Chicago 10, Illinois
Don Martin, Representative

Pfaff and Kendall
84 Foundry Street Newark 5, New Jersey
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Prismo Safety Corporation
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Ellis Webb, Representative

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222 Beach Street Shreveport, Louisiana
J. Frank Williamson, Jr., Representative

The Streeter-Amet Company
Grayslake Illinois
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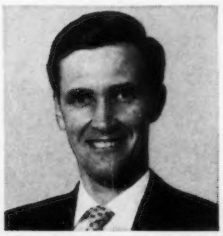
Lightweight, easy-handling aluminum signs go up fast. While R. J. Colpitts looks on, foreman Omer Lane easily installs this sign in only 10 minutes. Alhambra's signs are fabricated from Kaiser Aluminum blanks with reflectorized sheeting by the Mask-Off Company of Monrovia, California.

"For our money, only cost-saving aluminum signs will do!"



... says R. J. Colpitts, Traffic Engineer, Alhambra, California

"We like aluminum traffic control signs because we are able to get the type of sign we want—with both initial and long range savings over other materials," reports R. J. Colpitts, Traffic Engineer, Alhambra, California.

"And we know we'll save plenty on maintenance and replacement costs, as well. With rustproof aluminum, the oxidation problem is reduced to an absolute minimum. There's no need for us to protect the edges and back surfaces of our signs.

"What's more, because aluminum signs are so easy to work with, they give our sign shop greater flexibility. We can tailor-make our sign program to suit our particular needs with little added equipment.

"No doubt about it. With us, it's aluminum traffic control signs all the way!"

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Let us make a bid. For expert service on money-saving aluminum signs, call the manufacturer, fabricator or Kaiser Aluminum sign blank jobber near you.

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Bell & Gustus, Inc.
Federal Sign & Signal Corp.
Spencer, Ind.
Stello Products
Cleveland, Ohio
Osco Steel Co.
U. S. Steel Supply
Clinton, Mass.
Standard Sign & Signal Co.
Dallas, Tex.
All Quality Sign & Mfg. Co.
Elmira Heights, N. Y.
Eastern Metals of Elmira, Inc.
Evanston, Ill.
Northwest Screenprint Co.
Grand Prairie, Tex.
Sargent-Sowell, Inc.
Houston, Tex.
Western Sign & Supply Co.
Indianapolis, Ind.
Midwest Fire & Safety Equipment Co., Inc.
Lancaster, Pa.
John I. Nissly Co.
Little Rock, Ark.
Moody Equipment & Supply Co.
Marion, Ind.
Jim Newey and Assoc.
Metairie, La.
W & A Engineers
Miami, Fla.
Biscayne Fire Equipment Co.
Minneapolis, Minn.
Lyle Signs, Inc.
Monrovia, Calif.
Mask-Off Co.
North Tonawanda, N. Y.
Northern Electric Supply Co.
Overland, Mo.
Wiegand Mfg. Co.
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James P. Flynn Co.
Petaluma, Calif.
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Philadelphia, Pa.
Advertisers Service Co.
Rocky River, Ohio
Bowman Western Stamping Co.
Sacramento, Calif.
The Dosch Co.
St. Louis, Mo.
Parco Supplies
St. Paul, Minn.
Gopher Stamp Co.
Tacoma, Wash.
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Traffic and Street Sign Co.
84 Foundry Street Newark 5, New Jersey
W. M. Schoenfeldt, Representative

Union Metal Manufacturing Company
1432 Maple Avenue, N.E. Canton 5, Ohio
W. A. Porterfield, Representative

Veon Chemical Corporation
2209 Bridge Plaza N., Long Island City 1, N. Y.
Dwight T. Myers, Representative

Winko-Matic Signal Co.
P.O. Box 398 Lorain, Ohio
Irwin Hart, Representative

Positions Available

DEPARTMENT OF THE ARMY WASHINGTON, D. C.

Position: Traffic Engineer.
Requirements: Meet Civil Service requirements. Work involves reviewing field analysis of requirements for highway facilities at military installations and recommending specific facility and traffic regulatory improvements; occasional field evaluations and reports.
Salary: $8330 to $9530.
Apply: Send Standard Form 57 to Transportability and Engineering Division, Office of the Chief of Transportation, Department of the Army, Washington 25, D. C. Attn: Major J. E. Coleman.

COUNTY OF SAN JOAQUIN, CALIF.

Position: Traffic Engineer, to work in the Department of Public Works, in charge of all traffic engineering work in the County.
Requirements: College graduate, with major course work in engineering; 5 years of engineering experience, at least two years in responsible traffic engineering work; or any equivalent combination of such education and experience.
Salary: $606 to $736 per month, plus fringe benefits.
Apply: Personnel Director, 732 East Main Street, Stockton 2, California.

CITY OF EUGENE, ORE.

Position: Traffic Engineer.
Requirements: Minimum of two years experience in traffic engineering and traffic control. Will plan, direct and coordinate the activities of the Traffic Engineering Division of Eugene (pop. 47,600).
Salary: $6504 to $7200.
Apply: City Manager, Eugene, Ore. giving references, experience and education.

METROPOLITAN DADE COUNTY, FLORIDA

Position: Traffic Planning and Design Engineer, Department of Traffic and Transportation.
Requirements: Graduation from recognized school in civil engineering, and experience in highway geometric and bridge design and cost estimating.
Salary: $534 to $680 per month with fringe benefits; Civil Service.
Apply: Department of Traffic and Transportation, Metropolitan Dade County, 850 N. W. 23rd Street, Miami 37, Fla.

(Continued on page 59)

Institute Affairs

Board of Direction Meets May 22 and 23

The Board of Direction met in Highland Park, Illinois on Friday and Saturday May 22 and 23, 1959, and took the following action:

(1) Heard President Sielski announce appointment of Institute representatives to a joint committee of ITE and American Institute of Planners.

(2) Approved naming Joseph E. Havenner as ITE representative (and automatic chairman) of Matson Memorial Fund Board of Award.

(3) Approved the general idea of inviting the sponsors of the International Traffic Study Week to send a delegation to the U. S. in 1961 for a special international conference, probably to be held in conjunction with the Annual Meeting.

(4) Voted to cooperate with the U. S. Jaycees and several technical groups in an advisory committee to guide a project in community development.

(5) Elected 43 new members, including 30 Juniors, 12 Associates, and 1 Member.

(6) Advanced 24 present members to a higher grade, including 15 from Junior to Associate and 9 from Associate to Member.

(7) Declined or deferred action on 30 applications for membership and 8 requests for transfer.

(8) Accepted with regret the resignation of 5 members, which with other changes brought the total membership to a record total of 1271.

(9) Heard a report that 30 Sustaining Organizations have paid the $300 fee for 1959.

(10) Approved a suggestion from the Membership Committee for a plan of personal interviews of some or all applicants for admission.

(11) Heard a report from the nominating Committee with a slate of Officers for 1959-60 as follows:
President—Edward G. Wetzel
Vice Pres.—Alger F. Malo
Vice Pres.—Gordon K. Gravelle
Sec.-Treas.—Robert A. Burch
(elect one) William R. Marston
Dir., Dist. 1—Fred W. Hurd
Dir., Dist. 2—O. K. Normann
Dir., Dist. 4—Evan E. Olmstead

(12) Received and ordered to the Annual Meeting agenda a petition to amend the Constitution to make Associate Members eligible for election as Directors.

(13) Voted to submit a proposal for an increase in dues to the membership.

(14) Voted to increase advertising rates in the magazine 15 per cent, effective January 1, 1960.

(15) Authorized employment on a part-time basis of an editor for the magazine.

(16) Voted to present awards for traffic engineering performance in 1958 to 12 states and 79 cities.

(17) Decided that non-member representatives of commercial organizations in attendance at the Annual Meeting to display or sell a product would be charged a higher fee and issued a distinctive badge.

(18) Agreed to present to local Sections and other interested parties the report on District boundaries which came out of the recent Workshop, and also to place the matter on the agenda for discussion at the Annual Meeting.

(19) Approved an amendment to the Missouri Valley Section By-Laws changing the date of the Section's annual meeting.

(20) Voted to approve the report of Committee 3-D as an information report, to be published as such in the magazine, with comments requested.

(21) Heard a report that the stock of the present Handbook is exhausted and that work on the new edition is progressing, with first drafts completed on eight chapters.

(22) Voted to investigate the possibility of ITE participation in a forthcoming Inter-American Highway Congress.

Board Approves 24 Transfers, Elects 43 To Membership

At the May meeting of the Board of Direction, 24 members were transferred to a higher grade and 43 others were elected to membership in the Institute. The list of transfers and new members can be found on page 53.

News and Notes on Your New York Convention

Your headquarters for the 1959 annual meeting will be the world famous Hotel Commodore located at Lexington Avenue and 42nd Street in the heart of Manhattan. Those who attended the 1950 meeting need no introduction to our hotel. Others who have visited New York for business or vacations have found it a most pleasant and convenient place to stay. For those of you who have yet to visit New York or who are not acquainted with the Commodore, we offer this to assist you in your planning.

The Hotel Commodore is conveniently located for all methods of transportation. In fact, for those traveling by rail, there are direct entrances into the lower lobby of the hotel from both the Grand Central and B & O Railroad terminals. Pennsylvania Railroad Station is only a few minutes away. If you are an air traveler both the Eastside Airlines terminal at the Queens Mid-town tunnel plaza and the Westside Airlines terminal at the Lincoln Tunnel plaza are only a few blocks from the hotel. Passengers arriving at either New York International Airport or La Guardia Airport will find quick and convenient ground transportation into the Eastside terminal while those using Newark Airport will be brought into the Westside terminal. For those of you who plan to bring your car, garage service can be quickly arranged at either of the hotel entrances.

This modern, air conditioned hotel is located just minutes away from major business, shopping and entertainment centers. Express subways and buses to more distant parts of town are only a few steps from the lobby. Such unique points of interest as the Empire State and Chrysler Buildings, Radio City, Times Square, St. Patrick's Cathedral, and St. Thomas' and St. Bartholomew's churches are within easy walking distance. For those of you who are more internationally minded, the United Nations has its headquarters just a few blocks away overlooking the East River.

Whatever your wishes, Baghdad-on-the-Hudson is ready, willing and certainly most able to satisfy them.

New York is looking forward to seeing you in September—come early and stay late. But whenever you arrive make our registration desk your first stop after you get settled. Sunday we will be on the mezzanine, but from Monday on we will be on the Ballroom floor—the center for all the many and varied convention activities planned to make your New York convention a memorable one.

Two-Day Workshop Held In Highland Park

Fifty-four Institute members attended a two-day workshop held in Highland Park, Illinois, on May 21 and 22. The meeting, called by President Sielski, was held to discuss the challenge presented by transportation problems created by the accelerated highway program and how the traffic engineering profession can best meet this challenge. Attendance was by invitation, with past and present members of the Board of Direction and representatives of each Section on the primary invitation list.

The workshop was divided into four discussion groups, each with a leader and secretary, as follows:

(1) Professional Qualifications
D. Grant Mickle, chairman
Fred W. Hurd, secretary

(2) Technical Development
A. F. Malo, chairman
Norman Kennedy, secretary

(3) Organizational Developments
Burton W. Marsh, chairman
Charles W. Prisk, secretary

(4) Annual Meetings
William R. Marston, chairman
Donald S. Berry, secretary

The four discussion groups met for a full day, and the entire group then assembled to hear and discuss the group reports. Participation in the discussions was very spirited, and a substantial number of important points and valuable suggestions developed. The workshop was not designed to set Institute policy, and did not attempt to do so. The full report of the proceedings will be published, however, as a basis for discussion.

EFFECT OF SPEED ZONE

(Continued from page 23)

sufficient evidence to draw some general inferences concerning the effects of the "modification" of the law and bring my discussion to a close. These inferences may be summed up as follows:

1. The law is sufficiently strong to give the Traffic Engineer needed support in establishing proper zones.
2. The law is sufficiently flexible to change existing postings if they fail to meet transportation requirements.
3. The law permits traffic to move at safe and proper speeds which fact in itself creates better public relations between public officials and motorists.
4. The law has proved to be an effective safety device. Dangerous overtaking and passing movements may be cut. Confusion, impatience, and frustration may be reduced, and a high degree of voluntary observance of the speed posting may be gained. This voluntary observance will enable enforcement officials to concentrate their efforts on the real speeders, the reckless and irresponsible drivers, on other types of violations that may be more hazardous to traffic, and not persecute the normally law-abiding motorists.
5. The law makes possible realistic limits which serve as driving aids. Not only do they indicate the legal and safe driving speeds, but they relieve a tremendous amount of driver apprehension that the driver inadvertently may be operating in excess of the legal requirements.
6. There is conclusive evidence that motorists approve the zones established on engineering principles.
7. Finally, it is reasonable to assume that in the new law we have the machinery at hand to establish and maintain workable speed zones throughout the State commensurate with safety and traffic needs.

NEW VOICE SYSTEM

(Continued from page 14)

speaker or, (b) turns on the audio output portion of the car radio if the latter is not being played so that the safety message can be heard through the speaker. When the safety message pattern is passed the radio is returned to its original condition. In addition, the message control mutes the output of the communications receiver until a suitable message level is intercepted. This function keeps ignition and other noises from being heard in the absence of a signal.

Completely transistorized versions of the above tuner in printed circuit form have been developed and put into use. The continuous current consumption from the car battery for this receiver is less than the current required to light one instrument panel lamp. Receivers complete with their own speakers have also been developed

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for use in vehicles having no standard car radio or having a car radio with a non-transistorized power output stage.

Applications

The scene in Figure 4 illustrates an emergency action taken by the highway patrol to reroute traffic to avoid a disaster area. The portability of the system permits a complete transmitter to be carried in the trunk at all times; a brief but pertinent message can be taped at the site.

The system is also ideally suited for national emergency purposes. Because of its confined coverage it can remain in operation when all other radiations are ordered off the air. Under certain circumstances it might well be used as a prime communications link. Ground to vehicle and vehicle to vehicle communications are possible military applications for this system.

The concept of having a simple, reliable and directed system of voice communications from a fixed station to a vehicle has been realized through the development of the inductive link described above. Although many applications can be envisioned for such a flexible system, the greatest benefit would be reaped by using it for purposes of improving conditions for safe travel on our nation's highways.

Section News

WASHINGTON (D.C.) SECTION

Officers for 1959-60

President ..... James L. Foley
Vice President ..... C. C. Robinson
Secretary-Treasurer ..... Wm. L. Carson,
% American Automobile Association
1712 G Street NW
Washington 6, D.C.

MICHIGAN SECTION

Officers for 1959-60

President ..... Russell E. Harrison
Vice President ..... Max R. Hoffman
Secretary-Treasurer ..... Harold L. Hickman
121 Grace Street
Flint 3, Michigan

MISSOURI VALLEY SECTION

Officers for 1959-60

President ..... Ellis C. Henry, Jr.
Vice President ..... Wm. J. Armstrong
Secretary-Treasurer ..... Adrian H. Koert
% City Hall
Des Moines, Iowa

METROPOLITAN (N.Y.) SECTION

Castleton-on-Hudson Bridge

On May 26, 1959 the Thruway Authority opened to traffic its new Castleton-on-Hudson Bridge across the Hudson River south of Albany. This $17,000,000 bridge provides the final link in the connection between Massachusetts Turnpike and the main line of the Thruway. A 25-cent toll is charged all passenger cars for the use of this bridge in addition to the regular mileage fees. Trucks pay proportionately higher tolls.

Personals

Ed Ricker has left the New Jersey Turnpike Authority to join the Pennsylvania Department of Highways as Chief of Traffic Engineering Division.

Two local section members have been given new jobs with new titles by the Port of New York Authority. *Ed Wetzel* is now Special Assistant to the Director of Port Development Department and Gene Lessieu is now Assistant Terminals Planning Engineer.

Bill Bartels has resigned his post as Principal Highway Engineer with the New Jersey Bureau of Traffic Safety after 7½ years to accept the job of Traffic Planning Engineer with the City of White Plains. John E. Christ has joined the New Jersey Bureau of Traffic Safety as Senior Traffic Engineer after receiving his certificate from the Yale Bureau this spring. On May 10th T. T. Wiley was on the "hot seat" as he answered questions telephoned in to the WNYC radio program "Open Line." Ted Olcott of the Port Authority recently made a presentation to the Metropolitan Section of the ASCE on the design of the second deck of the George Washington Bridge.

Thruway Time—N. Y. City to Buffalo

A test car recently made the 421-mile trip on the Thruway between New York City and Buffalo in seven hours and 21 minutes, a saving of three hours and 19 minutes over the parallel route. The Thruway route was traversed at an average speed of 57.4 m.p.h. compared with 38.8 m.p.h. on the parallel roads. Savings via the Thruway were 0.7 miles per gallon, 159 fewer brake applications, 119 fewer traffic lights and avoidance of 75 miles of reduced speed zones.

MIDWEST SECTION

Stauffer's Restaurant on Madison Street was the scene of the April Meeting — our annual student chapter get-together. Over sixty members and guests, including about 20 student members from the University of Illinois and Northwestern University were present. Included among this throng were Profs. Baerwald and Berry, the wandering minstrel boy Tom Wiley, The Sage of Wacker Drive (upper Level) Jim Chambers and the daddy of all traffic engineers C. C. Wiley, Professor Emeritus.

After the usual festivities and amenities, including dinner, Pres. Al Forde got the meeting under way by presenting the First Annual Midwest Section Award to Mr. Fred Schweiger for an outstanding technical paper by a student. Mr. Schweiger gave a synopsis of his paper, "A Mechanical Method of Traffic Assignment," which was extremely interesting.

After the presentation of the check for $25, President Forde introduced the featured speaker, John Leisch of DeLeuw Cather and Company who addressed himself to the topic "Planning and Designing Urban Freeways?" Right away that raised the flurry of interest 'cause us Chicagoans who read the *Tribune* know that a freeway is the opposite of a tollway, and since the tollways are losing money, we wanted to learn how to make money. However, the talk didn't come out that way.

VIEW OF DAKOTA AVENUE, WAHPETON, N. D., shows the attractive daytime appearance of L-M's shallow-globe fluorescent luminaires. Mounting height is 28 feet, with Union Metal davit-type poles opposite each other at 100-foot intervals. This provides 1.2 footcandles of even, glare-free light. Installation by Hintgen-Karst Electric Company of Wahpeton.

Wahpeton Selects L-M Fluorescents for Complete New Street Lighting System

With cooperation of Otter Tail Power Company, Wahpeton's Street Committee makes thorough study and comparative analysis of various makes of luminaires for lighting business streets and neighborhoods.

More than 130 new L-M fluorescent lights illuminate the business section and side streets of Wahpeton, N. D., with ample soft, glare-free light. The installation, recently completed, replaced a 20-year-old incandescent system.

In a thorough study by the city, the power company made sample installations of a number of makes of luminaires for comparisons of appearance, effectiveness, maintenance and costs. The L-M shallow-type 6-foot units selected are equipped with two 150-watt (25 watts per foot) lamps that provide about 18,600 lumens per luminaire. This results in a maintained level of illumination on the street of 1.2 footcandles on Dakota Avenue. and 0.75 footcandles on side streets.

For complete information on L-M's complete line of outdoor lighting equipment and lighting application engineering, ask the L-M Field Engineer, or phone or write Line Material Industries, Lighting Division, Milwaukee 1, Wis. In Canada, Canadian Line Materials, Ltd., Toronto 13, Ont.

McGRAW EDISON

359-R

LINE MATERIAL Industries
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Outdoor Lighting

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PACKAGED SUBSTATIONS • CAPACITORS • REGULATORS • OUTDOOR LIGHTING • LINE CONSTRUCTION MATERIALS • PORCELAIN INSULATORS • FIBRE PIPE AND CONDUIT

John kept illustrating (by means of slides, sketches, drawings and Larry Dondanville's soup spoon) how to best design an urban expressway where volumes may be in excess of 70,000 vehicles per day. Needless to say, some of the boys who took John's course at N.U. felt a bit miffed at seeing the whole thing delivered free.

The May meeting of the Midwest Section was held in conjunction with the ITE workshop at the Moraine Hotel in Highland Park, Illinois. National President Matt Sielski was the featured speaker and delivered his kickoff talk to the meeting. Midwest Section members present were far outnumbered by the visitors from all corners of the country. It was pleasant to meet with so many well-known traffic engineering personages.

On June 4 twenty-seven Midwest Section ITEs met for the annual field trip. Chicagoland airports were the subject this year and the group inspected O'Hare International Airport and Glenview Naval Air Station. After lunch at the air station officers club some of the athletes toured the golf course while the sightseers took a spin in an airplane to view traffic problems from a new angle. George March won the Section Athletic Award for the best performance on the links and Jack Sorenson won the Midwest Hospital Award for the outstanding performance in the officers club bar. Now that everyone is safely on the ground again it can be revealed that Bob Zralek was copilot on that airplane.

INDIANA-MICHIGAN-OHIO SECTIONS

Tri-State Annual Meeting including Ontario

The Indiana-Michigan and Ohio Sections of ITE invited Canadian members of Ontario to participate in the Annual Meeting held at Pokagon State Park, Angola, Indiana on June 5, 6, and 7.

There were 105 registered for the meeting.

The Technical Session on Saturday morning included three subjects of immediate importance to traffic engineers.

Max R. Hoffman of the Michigan State Highway Dept., gave a resume of the "Development and Purpose of Interstate Signing." He was followed by Floyd A. Kline, Jr. of the Indiana State Highway Dept., James V. Musick of the Ohio Dept. of Highways, and Roy D. Cowley of the Ontario Dept. of Transport. The problems, methods and results of Interstate Signing were discussed, followed by questions and a general discussion.

Mr. & Mrs. Al Hayes of Lansing, Michigan. The brush on Al was grown for the Centennial celebration in Lansing.

The second subject concerned "Traffic Control on the Mackinac Bridge" presented by Edward F. Gervais of the Michigan State Highway Dept. He gave an excellent description of the traffic problems involved on the big bridge, then showed color photos and slides.

The third subject was "Angle Parking" given by a panel consisting of Harold L. Michael of Purdue University, George W. Howie of Cincinnati, Arthur H. Lomax of Hamilton, Ontario, and Allen T. Hayes of Lansing who acted as moderator.

Mr. Michael who discussed "Results of Research" probably stunned some of his listeners by stating that some angle parking can be provided in the congested area on streets on which the traffic flow was rather low.

Mr. Howie gave a resume of the "Policy in Large Cities." Mr. Lomax presented the "Policy and Problems in Ontario" and Mr. Hayes concluded the talks by giving "A Case History" in Lansing.

Since Lansing is observing its Centennial this year, Mr. Hayes appeared with a masterful growth of beard giving him a most distinguished appearance.

The group was pleased to have some of our Canadian members with us. From Hamilton came Mr. and Mrs. Arthur H. Lomax and from Toronto came Mr. and Mrs. Raymond J. Desjardins; also, Mr. and Mrs. Roy D. Cowley of Don Mills.

Before the meeting was concluded, plans were set in motion for next year's meeting.

MICHIGAN SECTION

A film showing various tests now being conducted by the General Motors Proving Grounds at Milford, Michigan, was narrated by Mr. Ken Stonex, Assistant Director of the Proving Grounds, guest at the May Meeting of the Michigan Section.

The tests shown in the film involve the condition of the roadside including the various types of obstructions which are generally found, such as guard rails, trees, ditches, banks, etc. The tests made on plate rail show actual collisions between cars and plate rail and are performed at varying speeds and at varying angles with the plate rail. The film is highly recommended for information on new test results.

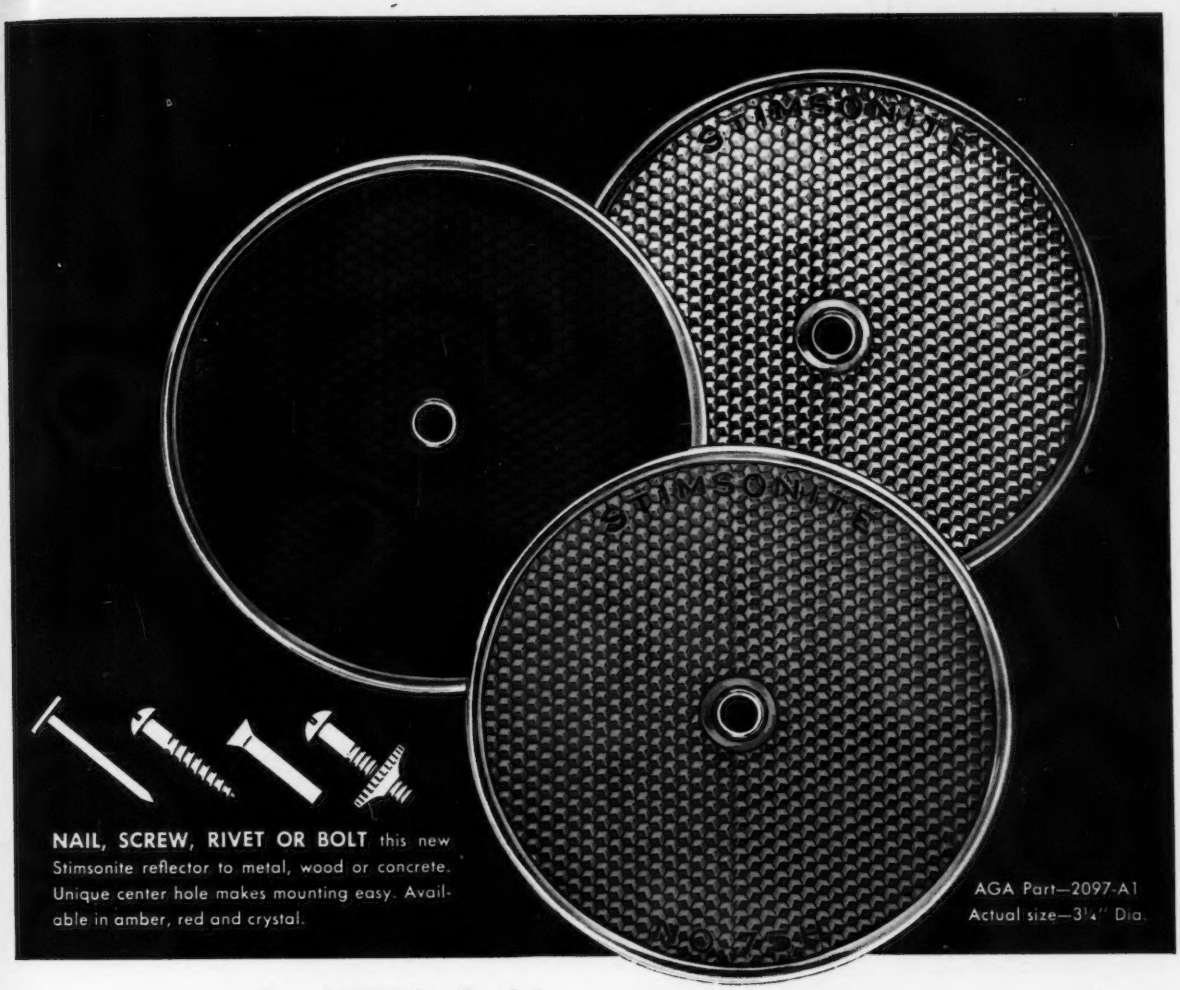
SOUTHERN SECTION

The annual business meeting of the Southern Section of the Institute of Traffic Engineers was held on March 3, 1959, in Asheville, N. C. This meeting was held in connection with the Southern Safety Conference and held following the first technical session of our Traffic Engineering Section. The first item of business was a discussion of the current National Board of Directors' proposal for redistricting. John F. Exnicios read a draft of a resolution written by the Louisiana members objecting strenuously to the separation of Louisiana from the Southern Section. Dave Baldwin was present and commented on redistricting. Under the present by-laws the Board of Directors is required to study the question of redistricting each year. Two conditions are bringing to a head the need for revision of the District quarter boundaries. First, the Western Section is very large geographically and the largest in membership and some Divisions should be made more uniform. Secondly, the growing Canadian membership has an increasing feeling that they should be more adequately represented. Chairman Jordan appointed a committee consisting of John F. Exnicios, Bob Burch, and Karl Bevins to restudy redistricting in the light of the interest of the Southern Section.

Bob Burch, Bill Mann, Fenton Jordan and Bill Derrick attended the I.T.E. Workshop which was held in Highland Park, Ill. May 21 and 22. At this time a resolution from the Southern Section as well as other sections of the U.S. presented their proposals as to what they would like their respective sections to consist of.

All of the officers of the Southern Section were not elected at the business meeting because the ballots were placed in the mail too late to be counted at the annual meeting. A committee was appointed and motion of the committee made to count the ballots later. The committee was appointed by Mr. Jordan. The officers for the coming year are:

WATCHING THE SQUARE DANCING—Mrs. Irwin Hart, George Howie, Cy Clark, Irwin Hart, Mr. & Mrs. Tom Young.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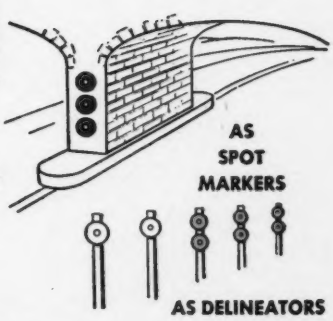

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Bill Derrick, President; Herman Hoose, Vice-President; Marble Hensley, Secretary-Treasurer.

A discussion was held about what should be the status of the jobbers in the organization; whether they should have voting privileges or not. A Committee consisting of Herman Hoose, Chairman, Art White and Bill Shrader were appointed to study our section by-laws and report their findings at the next meeting in New York.

Next year's meeting will be held in connection with the Southern Safety Conference in Jacksonville, Florida. Lamar Thomas of Orlando was appointed program Chairman; Harry Howard, Jr. of Jacksonville, Co-Chairman for next year's program.

As most of the members and associate members of ITE already know, Bob Burch has been nominated for the post of Secretary-Treasurer of ITE and has as a running mate William R. Marston of the Chicago area. The Southern Section is going to have to do a lot of hard work for Bob to beat this man. Will any of you who have friends or know anyone anywhere else in the U. S., please take a little time out and write this friend and ask for his support for Bob? We feel that it is about time we had a man from the South as an officer of ITE and with a little work from each of you we should be able to swing enough votes to elect Bob. Let's all pitch in and help get a Southerner in office.

CANADIAN SECTION

A business meeting of the Canadian Section was held in Ottawa on Friday, 8th May, 1959 and was attended by the following:

A. H. Lomax ..... *President*
W. H. Finnbogason ..... *Vice-President*
J. Barriere ..... *Eastern Director*
D. Kuchinski ..... *Western Director*

W. Q. Macnee, F. Gillies, L. Forster, D. Brooks, H. L. Burton, W. Mitchelson, T. Neilsen, H. Edwards, P. Ewart, J. Harding, R. Bailey, R. Cowley, H. F. Burns, R. Campbell and B. Huffman.

H. F. Burns acted as secretary for the meeting.

Considerable discussion was held concerning the possibility of having three regular Canadian Section meetings each year instead of just the Annual Meeting as at the present time. It was felt that this would create more opportunities for Canadian Section members to meet each other at least once a year. The additional meetings would be held in conjunction with the Canadian Good Roads Association and the Canadian Highway Safety Conference conventions as well as the Annual Meeting which is held in conjunction with the ITE convention. The local members in the host city of the CGRA or CHSC would act as a local arrangements committee and schedule the meeting so as not to conflict with the convention program.

It was moved by R. Cowley and seconded by J. Harding that:

"The executive of the Canadian Section of the Institute of Traffic Engineers explore and develop means for arranging a minimum of three meetings a year of the CITE, to coincide with the annual meetings of the CGRA, the CHSC and the ITE."

Carried unanimously.

Art Lomax gave a report on the ITE Workshop to be held in Chicago, indicating to the members its main objectives.

It was moved by R. Campbell and seconded by H. Edwards that:

"The members of the CITE go on record as being strongly in favour of the creation of a separate ITE District for Canada."

Carried unanimously.

The following resolutions were also passed:

a. "That the membership of the Canadian Section make every effort to provide a strong representation at the CGRA meeting in September to support W. Q. Macnee in his presentation of the Canadian Manual of Uniform Traffic Control Devices."
b. "That the membership of the Canadian Section cooperate fully with the CHSC in those elements of traffic matters which involve other agencies, such as: law enforcement, public education, etc."
c. "That the Canadian Section of the Institute of Traffic Engineers endorse the resolutions of the Engineering Committee of the Canadian Highways Safety Conference."

WESTERN SECTION

Bay Area

Norman Kennedy of the ITTE, University of California, attended the recent ASCE Meeting in Cleveland and presided over a session of the Urban Transportation Committee, of which he is Chairman.

The second section of San Francisco's Central Freeway was opened to traffic recently. The Central Freeway is a north-south artery connecting with the Bayshore Freeway and essentially paralleling Van Ness Avenue. The section just opened provides a double-decked full freeway from the vicinity of Mission Street, where the first section had ended, to the Civic Center area north of Market Street. Eventually, the Central Freeway is intended to be part of a freeway connection between the Bay and Golden Gate Bridges, but because of the now famous decision of the San Francisco Board of Supervisors to discard a number of pending freeway projects, future extension of the Central Freeway is uncertain.

Ross Shoaf and his staff prepared for the opening of the new freeway segment by posting towaway signs and adjusting signal cycles on several streets due to receive extra traffic loads from the on and off ramps. These measures have proven more than adequate thus far. The new section of Central Freeway is the fourth major facility in the Bay Area with separate decks for opposing traffic flows; the other three double deckers being the Bay Bridge, the Nimitz Freeway in Oakland, and the Embarcadero Freeway in San Francisco.

The short course in Traffic Engineering Fundamentals usually given by ITTE at two-year intervals, will be presented again in August, 1959 because of the heavy demand last year. It will be taught in the Bay Area. Detailed announcements will be available later.

The Bay Area welcomes veteran ITE member Kenneth Hoover, who has moved from Washington, D. C. to San Francisco to become the Bay Area Rapid Transit District's first chief engineer.

San Diego Area

The Past Chairman of the San Diego Area, Hal Durham, now Traffic Engineer for the City of Downey, was the guest speaker for the Area's April dinner meeting. Hal made a very interesting and enlightening presentation on the "Development of Traffic Engineering in Downey—The First Year." The Border City members want to thank the Los Angeles Area again for its support at this meeting, and many thanks to Roy Meggison for the Door Prize.

Charles P. Strong was welcomed to the San Diego Traffic Engineering Staff. Chuck will head up the various traffic planning studies and serve as Traffic Engineering Representative to the Transportation Research Office. Chuck reports that he was properly indoctrinated by being required to work until 7 o'clock the second night with the City.

San Diego's Advance Transportation Planning Team has completed several major freeway-major street transportation planning studies during the past several months. Ed Hall reports that these studies have provided useful answers, and again demonstrated the important City-County cooperation that is fostered by the team approach to these difficult planning problems. The five-man team is constantly increasing its facility to make difficult problems appear simple by the application of factual planning, traffic, design and economic studies in the solution.

Steve George, who recently left the San Diego Transportation Study to accept the position of Assistant Director of the Twin Cities Transportation Study has kept his San Diego friends well posted on his travels from San Diego to Minneapolis and of the interesting tasks he is undertaking there.

San Diego City and County employees have just received the welcome news that a five per cent salary increase will become effective next July 1st. Local Traffic Engineers have already calculated that by the time the raise appears on paychecks, it will be just too late to spend at the Seattle Meeting.

Freeway planning and construction in the San Diego Area continue at a merry pace. Rumors that the latest belt-line alignment takes Marty Bouman's home are completely unfounded—only his front and back yards will have to go.

Work on two major regional shopping centers in San Diego is progressing rapidly. College Grove Center on State 94 Freeway now stands with construction about one-half completed. Mission Valley Shopping Center near the junction of US80 and US395 Freeways is nearing completion of the planning and engineering stage with the start of construction slated for later this year. In the meantime, downtown is striking back with three major parking garages under construction, and a fourth about to begin. All in all, a healthy outlook for San Diego.

Jim Reading's staff continues to fret over traffic disruption soon to be prevalent when US101 Cross-town Freeway construction begins. However, its all in the name of progress and will be taken in stride. Don Robbins and John Tsiknas wear those worried looks because they are trying to sell one-way and detour plans to the City Fathers.

City-County cooperation is paying off at a hazardous location on Murphy Canyon Road at the City-County boundary. In recent years, the location has been the scene of one double and one triple fatality accident. Vehicles were going out of control on a curve in the County, then skidding into a bridge abutment in the City. County Traffic Engineer, Paul Fowler, installed oversize warning signs of special design, while City crews were placing guard rail, sight posts, and generous amounts of reflectorized paint. So far, both parties have their fingers crossed, and all is quiet on the eastern front.

Sacramento Area

On April 6th, the Sacramento Area held its regular monthly meeting at the Public Works Building. Chairman George Hill appointed Karl Moskowitz, Mel West, and Dee McKenzie to the Nominating Committee to prepare a suggested list of officers for the coming year.

The next order of business was a discussion on Russ Pearson's question, "How to Make the Governor's Safety Conference More Effective?" Following the discussion of suggestions pro and con, Roy Mathews, Russ Pearson, and Maynard Glass were appointed to frame a resolution to the Steering Committee of the Engineering Section as to ways of improving the conference —

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namely better exchange of leaders between Sections and the attending of other section meetings by delegates. Karl Moskowitz was asked by the Chairman to contact the Law Enforcement people and sound them out on the possibility of a joint social meeting to get groups acquainted.

On May 4th, the regular monthly meeting was held in the Public Works Building. The first order of business was a report of the Nominating Committee (Moskowitz, McKenzie, West). The following slate of officers was presented:

For Area Chairman—Charles E. Zell
For Vice-Chairman—Lee D. Kies
Roy Mathews
For Secretary-Treas.—Russ Pearson
Maynard Glass

An outline of suggested ways of improving the California Governor's Safety Conference was submitted for discussion by Pearson, Mathews, and Glass. After much discussion, it was suggested that the outline be revised and then sent to the other California areas for their comments. Karl Moskowitz was added to the committee.

Dud Stevens returned May 18th from two weeks military duty at Fort Belvoir, Virginia. Charles E. Zell, representing the California Division of Highways spoke before the Sacramento Valley-Northern California Planners Association recently. On Monday, May 18th, Mel West was given an opportunity to expound before the Bay Area Section. Lynn Stewart writes that he resigned as Traffic Engineer for the City of Fresno, effective May 8th.

Inter-Mountain Area

Complete returns in the postcard survey conducted last month in the downtown area are now in. Of 5,000 cards distributed, a very commendable 1,672 usable cards were returned. O & D data are still being analyzed, but preliminary review indicates that considerable valuable data have been obtained. The record for the greatest distance a card had been returned was from London, England. This was apparently given to an English tourist using a rented car the day of the survey. The card was returned airmail properly filled out. Not to be overlooked were the humorous cards which some witty drivers chose to return. Among them were the following: in the destination, one motorist said "never made it, fell into a chuck hole." Another, obviously a hot rodder, mentioned a Denver High School as its origin, and said the trip purpose was to "wrap up my pipes." Still another listed the origin as "the moon in orbit," and the destination was "Venus," and the purpose was to "spy on the earth for an invasion."

Last month it was reported that John Burg had been to Omaha for the Freeways Seminar. John is now recuperating at home from a bad case of ulcers, which necessitated a trip to the hospital last week. We all wish him a speedy recovery and return to the office.

Inter-state signing on the Valley Highway is now completed. No longer does the Denver Traffic Engineering office receive calls from lost motorists asking how to get through Denver.

Traffic enforcement on the Valley Highway is presently in a state of confusion. The Superior Court Judge has over-ruled Municipal Courts by indicating that Denver has no authority to enforce traffic regulations on the Valley Highway. However, the Denver Police Department, on the advice of the City Attorney, is continuing to issue citations and the Municipal Judges are continuing to assume jurisdiction in the cases. Anyone who appeals a decision of the Municipal Judges has been having the case dismissed in Superior Court. The City has asked for a ruling from the State Supreme Court, but in the meantime things are quite confused.

A Driver Improvement School for traffic violators and other motorists, was started in March by the Denver Municipal Court. Judge Sherman G. Finesilver is serving as Director of the course. The course consists of four weekly sessions of two hours each, and a final testing session. The first week of the course is devoted to traffic engineering, and Jack Bruce, Bob Chester, and Lou Kisseleff are participating in this phase of the school.

At a recent session of the Colorado State Legislature, a bill was passed raising the prima-facie speed limit on certain high type facilities from 60 to 70 MPH. The Traffic Operations Section of the Colorado Department of Highways is busy studying design data on highway construction plans, together with existing speed zones, in order to establish the 70 MPH sections throughout the State. This law becomes effective July 1, 1959 and speed limits up to 70 became effective when posted with appropriate regulatory speed limit signs.

Al Pepper recently participated in a joint State-County meeting in the "Four Corners Area" at Durango, Colorado. Al's subject was entitled "Case Studies and Traffic Safety—How can Modest Investment and Traffic Control Devices or Improvements Pay Dividends in County Road Accident Reduction and Prevention"? He has been going around the state the last few months meeting with County Commissioner groups, selling the idea of "modest investments."

Arizona-New Mexico Area

The Arizona-New Mexico Area had a very successful seminar the weekend of May 1st and 2nd. Thirty-four persons attended the technical sessions on Saturday, and with the wives invited there were 38 at the dinner meeting. Out of town guests included Joe Nadon, City Traffic Engineer, El Paso, Texas; Al Bossi, City Traffic Engineer, Las Vegas, Nevada; Francis Burton, City Traffic Engineer, Albuquerque, New Mexico; and John Kennedy, Traffic Services Engineer, New Mexico Highway Department. In addition, Francis Burton, Al Bossi, and Joe Nadon brought their wives along and made a short vacation out of the trip.

Main speakers for the program included Ray Wilson, City Manager of Phoenix; William Willey, State Highway Engineer, Arizona Highway Department; Chuck Haley, City Traffic Engineer, Phoenix; and Harold Stead, Supervisor of Signals and Illumination, Arizona Highway Department.

The Traffic Engineering Division of the Arizona Highway Department is moving full steam ahead on Signal and Illumination design for the Interstate System. Special work is being done on an accident probability study, and it has received approval from the Bureau of Public Roads to conduct a placement study comparing shoulder stripe with delineators.

Canadian Area

A general report on highway needs up to 1976 for the internal Vancouver Metropolitan Area was released in April. It is entitled "Freeways with Rapid Transit." The six technical reports, covering the detailed technical data substantiating the general report, will be released about July. These reports will cover population and land use forecasts, motor vehicle travel analysis and forecasts, transit analyses and forecasts, arterial street and highway deficiencies, network assignments and evaluation, and stage development of the recommended freeway network.

The general report recommends $340,000,000 worth of freeways and bridges by 1976 in addition to the $90,000,000 worth already constructed, under construction, or committed. The first stage should be built by 1966 at a cost of $160,000,000, leaving $180,000,000 for the remaining ten years.

Transit was fully studied as well as motor vehicle travel. The report recommends freeway bus operation and separate transit facilities where necessary. It is estimated the separate transit facilities would augment the total freeway cost by 5 to 10 per cent.

Ken Vaughan-Birch, Traffic Engineer for Vancouver, and John Harding, Traffic Engineer for the B. C. Department of Highways, attended a meeting of the Joint Committee on Uniform Traffic Control Devices for Canada in Ottawa on May 7th and 8th. At this final session of the Joint Committee, a decision was reached with respect to all signs and the publication of a manual is now underway under the sponsorship of the Canadian Good Roads Association in which will be set out the recommendations concerning signs, signals and markings for uniform use throughout Canada.

Of particular interest is the decision to use a "positive symbol" type sign for indicating turn prohibitions and an entirely new school sign having a "schoolhouse" shape (pentagon) with a mid blue background on which school children figurines are shown in white. A number of other signs have been symbolized, but generally for the Canadian manual the U.S.A. recommendations as set out in the manual published by the Bureau of Public Roads have been kept in mind recognizing the need for continental uniformity.

At a previous meeting, the delay warrant for traffic control signals was adopted. One other feature in the field of traffic signals was that the specific job of developing a satisfactory pedestrian head and indication to bring about uniformity in this presently unsettled situation has been referred to the Research Committee (a committee to be set up to continue the work of the Joint Committee to keep the manual up-to-date).

No particular changes from present U.S.A. practices in highway markings are being proposed with the exception of one basic concept that a single solid longitudinal line is a "No Crossing" line and is to be defined as such.

The published manual will be presented at the annual meeting of the Canadian Good Roads Association to be held in Vancouver this September. It is the hope of Canadian traffic engineers that the manual will be adopted and the necessary legislation introduced by all ten Canadian provinces.

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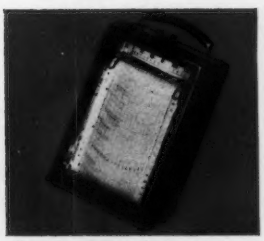

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BRADLEY, John P. (Junior to Associate)
City Traffic Engineer, City Hall, Colorado Springs, Colorado.

CHANN, Irving K. (Junior to Associate)
Traffic Engineer, Parson, Brinckerhoff, Hall & McDonald, 165 Broadway, New York 6, N. Y.

CHESTER, Robert C. (Junior to Associate)
Associate Traffic Engineer, City, Room 480, City & County Building, Denver, Colorado.

CLARK, Glen L. (Junior to Associate)
Senior Traffic Investigator, Oregon State Highway Department, Highway Building, Salem, Oregon.

CROCKETT, William R. (Junior to Associate)
Associate Traffic Engineer, Wilbur Smith & Associates, 2215 Devine Street, Columbia, South Carolina.

CROSBY, John R. (Junior to Associate)
Traffic Engineer, N. J. Turnpike Authority, New Brunswick, New Jersey.

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City Traffic Engineer, Municipal Building, Evanston, Illinois.

GALIOTO, Anthony J. (Junior to Associate)
Traffic Engineer, Port of New York Authority, 111 Eighth Avenue, New York 11, New York.

GILBERT, Jerry P. (Junior to Associate)
Traffic Engineer, City, 521 Water Street, Jackson, Michigan.

GRAVES, Paul B. (Junior to Associate)
City Traffic Engineer, City Building Annex, Wichita, Kansas.

HAMMOND, Daniel S. IV (Associate to Member)
Chief Engineer, Bruce Campbell & Associates, 177 Milk Street, Boston, Massachusetts.

HARRISON, Russell E. (Associate to Member)
Assistant Engineer of Traffic & Safety, Wayne County Road Commission, 7th Floor, City-County Building, Detroit 26, Michigan.

KANSMAN, Sven (Associate to Member)
Traffic Engineer & Chief of Civil Engineering & Land Planning Depts., Rader & Associates, 111 N. E. 2nd Avenue, Miami 32, Florida.

KUDLICK, Walter (Junior to Associate)
Engineering Specialist, Edwards & Kelcey, 3 William Street, Newark, New Jersey.

KYRK, Dennis D. (Junior to Associate)
Assistant Director, Office of Traffic Control, 501 City Hall, Oklahoma City, Oklahoma.

LEISER, Ervin R. (Associate to Member)
Senior Traffic Control Engineer, Bureau of Traffic Engineering, Electrical Services, Room 804 City Hall, Milwaukee, Wisconsin.

MUSICK, James V. (Associate to Member)
Chief Engineer, Bureau of Traffic, Ohio Department of Highways, 450 East Town Street, Columbus, Ohio.

PENDER, Michael R. (Junior to Associate)
Civil Engineer, Madigan-Hyland, 28-04 41st Avenue, Long Island City, New York.

PETERSON, Robert G. (Junior to Associate)
Assistant Traffic Engineer, City, 274 City Hall, St. Paul, Minnesota.

RICHEY, Maurice (Junior to Associate)
Traffic Engineer, Montana State Highway Department, Helena, Montana.

TSIKNAS, John C. (Junior to Associate)
Associate Traffic Engineer, City, 259 Civic Center, San Diego 1, California.

VOORHEES, Alan M. (Associate to Member)
Traffic Planning Engineer, Automotive Safety Foundation, 200 Ring Building, Washington 6, D. C.

WILLIAMS, Earl C. Jr. (Associate to Member)
Traffic Engineer, City, City Auditorium, Wichita Falls, Texas.

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BASS, Donald E. (Junior)
Traffic Engineer I, Wyoming State Highway Department, Cheyenne, Wyoming.

BLALOCK, Thomas M. (Junior)
Traffic Engineer, City, 456 West Olive Avenue, Sunnyvale, California.

BONE, Alexander J. (Member)
Associate Professor of Transportation Engineering, Massachusetts Institute of Technology, Cambridge 39, Mass.

BRABANSKI, Frederick W. (Associate)
Associate Signal Engineer, Department of Highways & Traffic, District Building, Washington 4, D. C.

BROWN, Richard C. Jr. (Junior)
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DE ROSE, Frank Jr. (Junior)
Highway Traffic Engineer II, Michigan State Highway Department, Stevens T. Mason Building, Lansing, Michigan.

DRUMMOND, Robert F. (Junior)
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FRERICH, William R. (Associate)
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HEGLUND, Carl T. (Junior)
Assistant Traffic Control Engineer, Wisconsin State Highway Commission, State Office Building, Madison 2, Wisconsin.

HIGGS, Robert W. (Junior)
Traffic & Photogrammetric Engineer, Federal Department of Public Works, Hunter Building, Ottawa, Ontario, Canada.

HIXON, C. Dwight (Junior)
Traffic Plans Engineer, Nashville Traffic Commission, City Office Building, Nashville, Tennessee.

IRBY, Howard E. (Associate)
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KAHL, William R. (Associate)
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MYLROIE, Willa W. (Associate)
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NAWATA, Akira (Junior)
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SORANNO, Vito V. (Junior)
Planning Technician, Port of New York Authority, 111 Eighth Avenue, New York 11, New York.

STEGMAIER, Joseph T. (Associate)
Highway Research Engineer, U.S. Bureau of Public Roads, Washington 25, D.C.

STENGER, Philip J. (Associate)
Associate Traffic Engineer, Virginia Department of Highways, 1221 East Broad Street, Richmond, Virginia.

STROMBOM, Donald A. (Junior)
Assistant Highway Engineer, Planning, Washington State Department of Highways, Transportation Building, Olympia, Washington.

STUBING, Henry D. (Junior)
Highway Engineer, DeLeuw, Cather & Brill, 202 East 44th Street, New York 17, New York.

TREITERER, Joseph (Associate)
Senior Research Officer, C. S. I. R., National Institute for Road Research, Private Bag 191, Pretoria, Union of South Africa.

VILLEMUR, Jean (Junior)
Section Engineer, Design & Planning Section, Traffic Department, City, 1125 Ontario Street East, Montreal, P. Q., Canada.

WONG, Oliver D. K. (Junior)
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MEMBERSHIP APPLICATIONS

The Institute of Traffic Engineers welcomes applications from qualified traffic engineers, but does not desire as members persons who are unqualified. Listed below are the names of those from whom applications for membership or transfer in grade have been received since the last published list. Institute members are urged to review this as soon as possible and immediately inform the Executive Secretary's office if names of people are found who are known to be unqualified for ITE membership or transfer.

NEW APPLICATIONS

GAILINAS, Paul Phillip
Traffic Engineer, Bruce Campbell & Associates, 177 Milk Street, Boston 9, Massachusetts. May 26, 1959, for ASSOCIATE.

KARAGHEUZOFF, Theodore T.
Assistant Civil Engineer, Head of Isolated Traffic Signal Section, Department of Traffic, City of New York, 100 Gold Street, New York. May 14, 1959 for JUNIOR.

MORALES, Leo
Assistant Civil Engineer, Porter, Urquhart, McCreary & O'Brien, Consulting Engineers, 421 Minor Avenue, Seattle 9, Washington. May 25, 1959 for JUNIOR.

SHAW, James W.
Chief Engineer, Ramp Consulting Service, Inc., 2 West 46th Street, New York 36, New York. May 11, 1959 for MEMBER.

THWAITES, Douglas Herbert Cody
Traffic Materials Engineer, Ontario Department of Highways of Ontario, Traffic Section, Parliament Buildings, Toronto 2, Ontario, Canada. May 5, 1959 for MEMBER.

SHIRRA, Graham Francis
Senior Planner and Traffic Engineer, Ogden City Planning Commission, Municipal Building, Ogden, Utah. May 26, 1959 for JUNIOR.

APPLICATIONS FOR TRANSFER

BRANDT, Warren H.
Field Engineer, Bureau of Traffic, Illinois Division of Highways, 595 South State Street, Elgin, Illinois. April 20, 1959 for MEMBER.

BULLOCK, Jesse Cave Jr.
Associate Traffic & Planning Engineer, Virginia Department of Highways, 1221 E. Broad Street, Richmond 19, Virginia. May 11, 1959 for MEMBER.

HOFFMAN, Max Richard
Reflective Devices Engineer, Michigan State Highway Department, Stevens T. Mason Building, Lansing, Michigan. May 5, 1959 for MEMBER.

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JOHNSON, Arnold Alfred
Assistant Traffic Civil Engineer, Arizona Highway Department, 206 South 17th Avenue, Phoenix, Arizona. May 4, 1959 for ASSOCIATE.

MITCHELL, Myron R.
Senior Engineer, City of Seattle, Department of Engineering, Bridge and Arterial Design Division, County City Building, Seattle, Washington. May 25, 1959 for MEMBER.

WALKER, Esper L. Jr.
City Traffic Engineer, City of High Point, City Hall, High Point, North Carolina. June 1, 1959 for ASSOCIATE.

YEARBOOK CHANGES

BARR, John W. (Junior)
Division Engineer, Traffic Planning Division, Metro. Dade County Traffic & Transportation Department, 850 N. W. 23rd Street, Miami 37, Florida. SEND MAIL: 7273 S. W. 53rd Avenue, Miami 43, Florida.

BOX, Paul C. (Associate)
Traffic Engineer, George W. Barton & Associates, 600 Davis Street, Evanston, Illinois. UNiversity 9-0660. SEND MAIL: 4050 Dobson Street, Skokie, Illinois.

CROSBY, John R. (Associate)
Traffic Engineer, New Jersey Turnpike Authority, New Brunswick, New Jersey. CHarter 7-0900. SEND MAIL: 118 Willow Ave. Rt. 24, New Brunswick, New Jersey.

DOBBINS, James B. (Junior)
Traffic Analyst, San Diego County Road Department, Room 014 Civic Center, San Diego 1, California. BElmont 9-7651. SEND MAIL: 4358 Cleveland Ave., San Diego 3, California.

FAULKNER, Zetto A. (Member)
City Traffic Engineer, 1025 Lake Street, Evanston, Illinois. GReenleaf 5-3100.

FRATAR, Thomas J. (Member)
Partner, Tippetts - Abbett - McCarthy - Stratton, 375 Park Avenue, New York 22, New York. PLaza 5-2000.

GROBY, Robert F. (Associate)
District Traffic Engineer, Michigan State Highway Dept., 100 E. Chapin Street, Cadillac, Michigan. PRospect 5-3487.

HILL, F. Norman (Affiliate)
General Manager, San Antonio Transit System, 310 South St. Mary's Street, San Antonio 5, Texas.

HILLER, Sherwood H. (Associate)
Traffic Engineer, City, P.O. Box 3090, Tampa 1, Florida. SEND MAIL: 137 Bosphorus Avenue, Tampa 6, Florida.

KAISER, John (Junior)
Assistant Civil Engineer, New York City Department of Traffic, 100 Gold Street, New York 38, New York.

KEESE, Charles J. (Member)
Professor of Highway & Traffic Engineering, Civil Engineering Department And Research Engineer, Texas Transportation Institute. Texas A & M College, College Station, Texas. VIctor 6-5707.

LYNCH, Col. F. C. (Member)
200 Olivera Lane, Sierra Madre, California.

MORAWSKI, Teddy J. (Associate)
Planning & Programming Engineer, Tennessee Division, U. S. Bureau of Public Roads, 7th Floor, U. S. Courthouse, 801 Broadway, Nashville 2, Tennessee. CHapel 2-9651, Ext. 398. SEND MAIL: 6221 Brownlee Drive, Nashville 9, Tennessee.

RASK, Peter K. (Member)
1294 Topeka Street, Pasadena, California.

RAY, James C. (Junior)
Traffic Engineer, City, Department of Public Works, 2509 South Lowell Street, Santa Ana, California.

SCOTT-SMITH, L. Theodore (Associate)
Consultant, 59 Robinwood Road, Waterbury, Connecticut.

SMITH, Donald L. (Associate)
Division Head, Traffic Operations Division, Metro. Dade County Traffic & Transportation Department, 850 N. W. 23rd Street, Miami 37, Florida. FRanklyn 7-1911.

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(Continued from page 28)

New Deadline on Use of Foreign Materials in U.S.-Aid Highway Work

State highway departments have until January 1, 1960, to begin complying with policies and procedures pertaining to restrictions upon the use of foreign materials in Federal-aid highway work.

Federal Highway Administrator B. D. Tallamy, Bureau of Public Roads, U. S. Department of Commerce, an nounced today a 6-month extension of the deadline for application to Federal-aid highway work from the original effective date of July 1, 1959.

To make provision for the time extension, he amended a Circular Memorandum issued to Public Roads Field Offices on April 23, 1959. The extension was provided to give both the State highway departments and industry more time to adjust their operations to the new regulations governing restrictions on the use of materials of foreign origin.

The April 23 memorandum stipulated that highway departments may restrict the use of foreign materials in Federal-aid highway work provided the restrictions do not exceed those now applied to Federal construction. It set forth certain conditions under which the use of materials of foreign origin could be restricted within the framework of the Buy American Act and an Executive Order which implements it.

The Buy American Act, enacted in 1933, gives preference to domestic materials, subject to considerations of reasonableness of price and the public interest. The Executive Order, issued in December 1954, among other things, provides a yardstick for determining the reasonableness of the price of domestic materials in relation to that of foreign materials. In general, it permits the use of materials of foreign origin if a saving of at least six per cent can be thus realized.

The April 23 memorandum stipulated that restrictions on construction items of foreign origin in Federal-aid highway work must conform with these requirements:

1. Bidders must be clearly informed of the restrictions and the particular materials or articles subject to the restrictions;

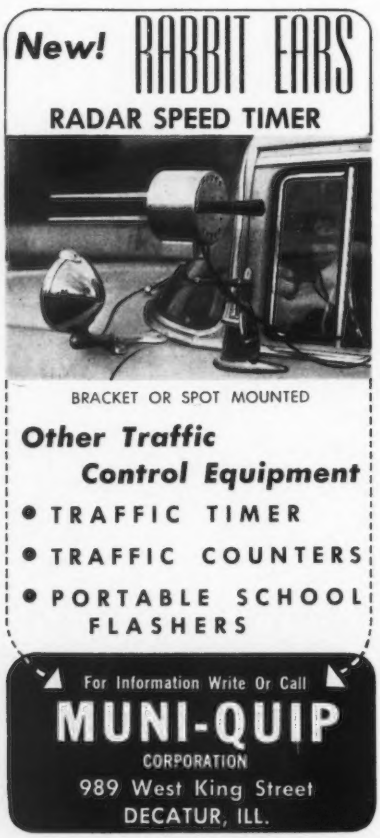
2. The restrictions may be imposed only upon a material or article that is set forth in the bid form as a bid item;

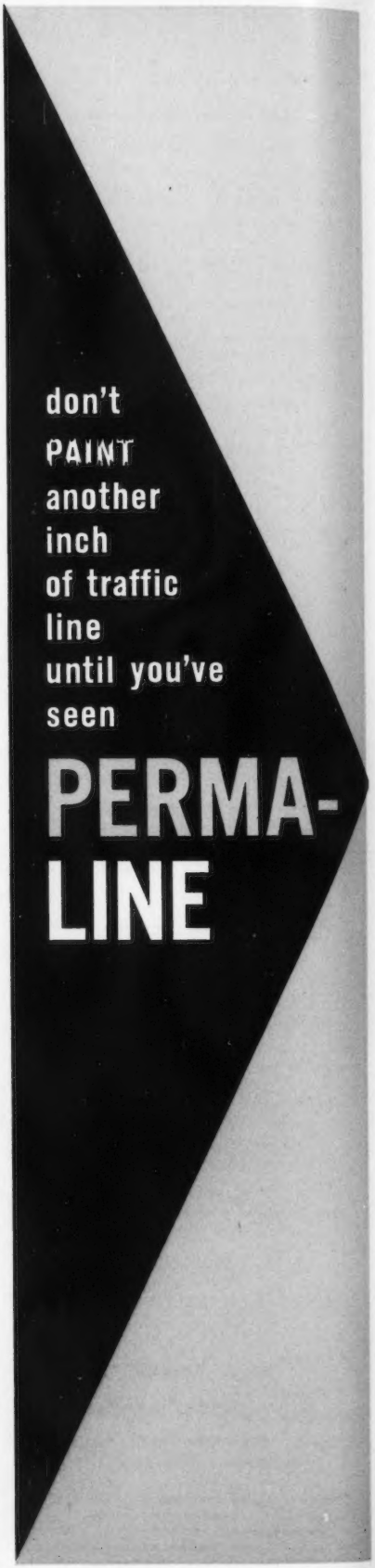
3. The bidder must indicate in his bid whether he proposes to furnish a foreign article or material;

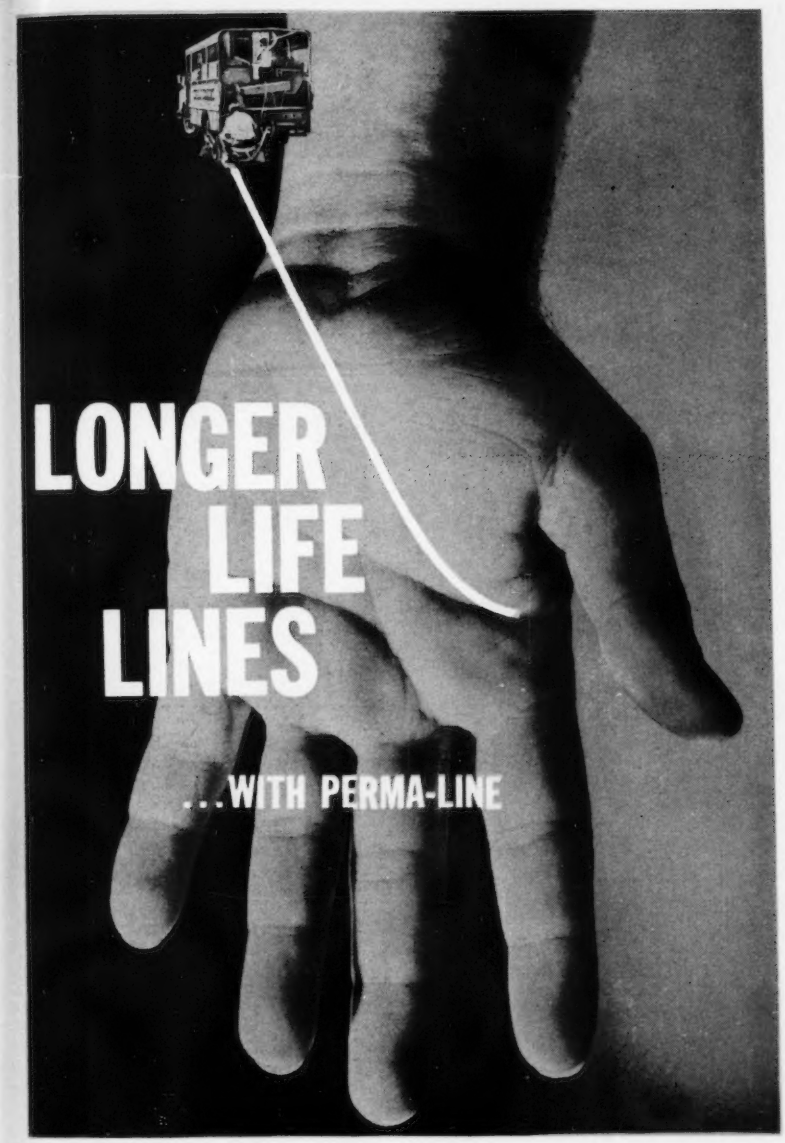
4. The bid price for any such bid item of any bidder offering a material or article of foreign origin shall be required to include applicable duty and all costs incurred after arrival in the United State, including costs of delivery of the material or article to the place specified, but not including its incorporation in the project;

5. For the purpose of comparing bids, the total bid price on the entire contract submitted by any bidder offering a material or article of foreign origin, shall be increased by an amount equal to six per cent of the bid price for such material or article;

6. The contract amount shall be based upon the bid as submitted, without regard to such differential.







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Proposed Federal Billboard Regulations

Secretary of the Interior Seaton has disclosed a comprehensive and flexible system of controlling billboards on Federal lands. The proposed regulations provide specifically for close coordination between pubic land billboard and advertising standards set up by the Department of Commerce as part of the expanded Federal highway program. Applications for erecting billboards for advertising on public lands are handled by the Department's Bureau of Land Management.

CONTINUOUS STRIP PHOTOGRAPHY

(Continued from page 12)

It is possible to conceive of a monitored automatic electro-optical readout and data conversion system which at the least would more than double the data reduction output and efficiency. In other words it appears possible to develop full utilization of computer techniques. When this occurs continuous stereo strip photography will be the analog source the traffic engineer will use for creating complete mathematical models of traffic flow and behavior.

METROPOLITAN AREA

(Continued from page 17)

traffic in the morning, outbound in the evening, or operated to bypass breakdowns and provide for emergency vehicles.

What about the future? A quick look based on predictions of traffic increases, etc. may scare us to death. But, if we take a look backward to see how we have progressed and are willing to learn from our experiences, we can face the future with confidence and zeal. And being a traffic engineer, a design engineer, or any other type of highway engineer, we can take pride in our achievements and satisfaction in our service to the all important element of transportation—the people.

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(Continued from page 42)

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